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SCIENCE AND TECHNOLOGY POLICY

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ORGANIZATION, PLANNING AND COORDINATION

MEANS OF BETTER MANAGEMENT OF SCIENTIFIC, TECHNICAL PROGRAMS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 85 pp 19-26

[Article by doctor of economic sciences Professor G. Dobrov, doctor of technical sciences Professor A. Korennoy, candidate of technical sciences V. Moiseyenko, and V. Shilo: "Problems in Improving the Management of Scientific and Technical Programs"]

[Text] The party is advancing today as the main strategic lever of the intensification of social production the cardinal acceleration of scientific and technical progress. This was emphasized with all definiteness at the April (1985) CPSU Central Committee Plenum. At the June conference in the CPSU Central Committee in the report of M.S. Gorbachev and in the statements of its participants it was noted that the acceleration of scientific and technical progress in the country is not only a large-scale, but also a complicated task. It will require of all workers creative and intense work, the revision of many obsolete notions, and the search for new economic and organizational forms.

The work on improving the management of scientific and technical progress requires a systems approach. It is deemed necessary by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures for the Acceleration of Scientific and Technical Progress in the National Economy" to expand the use of the goal program planning of the development of science and technology. Thus, the program approach to the management of scientific and technical progress is becoming the core unit of the entire system of national economic planning. The formulation of an entire set of programs, which includes all-union, republic (interrepublic), sectorial (intersectorial), as well as scientific and technical programs of regions and territorial production complexes, is envisaged starting with the 12th Five-Year Plan. Such a statement of the task stems from the incomparably increased interconnection of the objects of management and the need to maintain and use actively stable and reliable relations between all the elements of the unified national economic complex of the country. (Footnote 1) (See PRAVDA, 16 November 1984)

At present the goal program method in the management of scientific and technical progress is a qualitatively new form of planning, which is based on the systems approach to the organization of the management of the solution of

scientific, technical, and socioeconomic problems and is oriented toward the achievement of the best national economic results. Goal program management ensures the concentration of forces and resources on the fulfillment of the most important statewide and intersectorial tasks and contributes to the overcoming of departmental and other organizational isolation.

The formulation and implementation of scientific and technical programs are the embodiment of the goal program approach to the management of science and technology. At present definite experience in the formulation and implementation of programs of different types and levels has already been gained in the country. Thus, the Ukrainian SSR is participating in the fulfillment of the assignments of the bulk of the all-union programs. Here six republic comprehensive goal programs of scientific, technical, and socioeconomic development are being implemented: "The Energy Complex," "Metal," "The Material Intensiveness," "The Agroindustrial Complex," "Sugar," and "Labor." In each of the 37 republic ministries and departments the most important directions of development have been specified, 140 sectorial republic programs are oriented toward their achievement. In all 280 scientific research institutes, planning and design organizations, and higher educational institutions and about 9,000 industrial enterprises, construction projects, kolkhozes, and sovkhozes have been enlisted in the fulfillment of the assignments of the programs.

Such a concentration of scientific forces and the production and technical potential is making it possible to solve more quickly scientific and technical problems and to achieve the greatest national economic impact. Thus, the implementation of the Metal Program made it possible to save in 3 years of the 11th Five-Year Plan more than 600,000 tons of rolled ferrous metal products and 100,000 tons of cement. The implementation of the Energy Complex Program provided a saving of about 3 million tons of standard fuel and 1.4 billion kilowatt-hours of electric power. The economic impact from the fulfillment of the assignments of this program just in the fuel sectors of industry by the end of the 11th Five-Year Plan will come to more than 206 million rubles. The universal introduction of mechanized and automated lines and more advanced technology and the decrease of the use of manual labor are envisaged by the Labor Program. In industry alone during this period 230,000 workers were transferred to mechanized operations. The implementation of the assignments of the program made it possible to save the labor of more than 2 million people, practically the entire increase of the national income was obtained by means of the increase of labor productivity.

Experience shows that along with all-union, republic, and sectorial programs, regional programs also have great efficiency. More than 160 regional programs are being implemented on the initiative of 25 oblasts of the Ukrainian SSR and Kiev. A significant impact was obtained from the implementation of the Donbass Comprehensive Program, the program of scientific and technical progress in Kharkov and Lvov Oblasts, the economic program in Dnepropetrovsk Oblast, the program "Heavy and Manual Labor Onto the Shoulders of Machines" in Zaporozhye and Nikolayev Oblasts, and the program of the introduction of new advanced technologies at enterprises of Kiev. The goal of each of them is the more complete use of the already created scientific and technical potential

and the extensive introduction of advanced technologies, equipment, machines, and devices and advanced forms of the organization and remuneration of labor.

With the use of the experience of a number of oblasts and scientific centers of the Ukrainian SSR Academy of Sciences the procedural principles of the regional management of scientific and technical progress and the organizational and economic principles of the integration of science and production are being elaborated and elucidated, the trends and prospects of the development of these forms in the country are being revealed. (Footnote 2) (Ya.S. Podstrigach, "Problemy regionalnogo upravleniya nauchno-tekhnicheskim progressom (teoriya, metodika, praktika)" [Problems of the Regional Management of Scientific and Technical Progress (The Theory, Method, Practice)], Moscow, "Nauka", 1984)

This year a statute on the procedure of the formulation of scientific and technical programs of regions and territorial production complexes, the implementation of these programs, and the monitoring of their fulfillment was drafted and approved.

The procedure of formulating regional scientific and technical comprehensive programs, which are governed by the specific nature of the region, can be the following: the scientific and technical potential of the region is taken into account; a list of scientific and technical problems is drawn up; the most important directions are identified; the program elaboration of these problems on the regional level is carried out; the interconnection of the draft program assignments is carried out; the formulated programs are included in the plan of the economic and social development of the region; the current checking of the implementation of the given plans is carried out.

The formulation of such programs, and all the more so their implementation are a complicated and painstaking matter. They are formulated under the supervision of the oblast party committees with the direct participation of the corresponding scientific centers of the Ukrainian SSR Academy of Sciences. The goals of the programs are to unite and concentrate the efforts of ministries and departments and the scientific and technical potential of the oblasts on the solution of regional problems.

The day-to-day monitoring of the fulfillment of the programs on the scale of the region is assigned to the coordinating councils, which the oblast party committees and scientific centers of the Ukrainian SSR Academy of Sciences supervise, and at enterprises to the technical and economic councils. It is necessary to note that the possibilities of the oblast scientific and technical information centers in the matter of monitoring the progress of the implementation of the assignments of the regional programs are still not being fully utilized, although they do carry out the current monitoring of the fulfillment of union and republic programs.

The councils for the promotion of scientific and technical progress attached to the oblast party committees carry out the coordination of all the work of local party, soviet, and economic organs on the acceleration of the introduction of the results of scientific and technical developments, the

mechanization and automation of production, and the dissemination of advanced labor methods.

Contracts on the creative cooperation of scientific and production collectives, reviews of the introduction of the achievements of science and technology, relay races and exhibitions of scientific and technical achievements, and applied science conferences have become widespread. All this is making it possible to promote more extensively scientific and technical achievements and is contributing to their more rapid introduction and the efficient use of the available production potential, that is, is making it possible to implement in practice that at which the regional programs are aimed.

The increase of the level of coordination of regional scientific and technical developments should lead to the restoration of the proportions of the development of the units of the scientific and technical cycle "research--production." For this it is necessary first of all to overcome the lag of the planning and design and especially the experimental and pilot production base and thereby to speed up the scientific and technical cycle at the stage of the assimilation of new equipment and to improve the preparation of production for the introduction of advanced technological processes.

The formation of the programs and the system of the management of goal program scientific, technical, and production economic activity is taking place in the republic under the immediate supervision of party organizations. The formation, active development, and checking by life of a number of forms of the regional management of scientific and technical progress, which function mainly on a voluntary basis and harmoniously supplement the existing centralized forms of sectorial management, are their basic traits.

The establishment of councils for the promotion of scientific and technical progress attached to party organs and scientific centers of the republic Academy of Sciences is making it possible to plan and coordinate the direct contacts of science and production and to use better the scientific and technical potential of regions and is contributing to the development of the process of the interpenetration and interconnection of the program structures of scientific and technical activity. "This," as V.V. Shcherbitskiy notes, "is an important link in the system of the management of scientific and technical progress, in which the activity of the scientific institutions of the region is coordinated, scientific and technical programs are formulated, and the efforts of the scientists of academic, sectorial, and educational institutions are concentrated on the fulfillment of these programs. The participation in this work of party committees and soviet organs is making it possible to overcome departmental barriers more rapidly and to solve difficult organizational problems." (Footnote 3) (V.V. Shcherbitskiy, "Nauchno-tekhnicheskiy progress--zabota partiynaya" [Scientific and Technical Progress Is a Party Concern], Kiev, Politizdat Ukrainy, 1983, p 213)

The participation of the leading scientific and technical organizations and production enterprises in the formulation and the assurance of the implementation of sets of goal program operations, which are interconnected in a technological systems manner, has become more active and direct. However,

at the present stage of the formation of the system of goal program management these positive trends have not yet received final standard recognition in the country and republic. Thus, several of them are of the nature of an initiative or a potential, not always used possibility. Their development and regular use in the practice of planning and management are a most important reserve of the increase of the efficiency of the technology of management.

Goal program management requires the increase of scientificness in the solution of the corresponding problems. Forecasting, the formulation of programs, and the organization of their fulfillment are all processes which contain a large portion of research work. The method of such management should include points which ensure the close interaction of science and practice. The goal program approach has been used in our socialist practice for a long time. At present it is a question of its mass application. The most important principles, on which this approach is based, are the continuity of scientific, technical, and social forecasting and planning and the use for this of the entire arsenal of the modern science of management and computer technology (the method of the "forecasting graph," the optimization of the distribution of resources, the system of interactive planning, and so forth).

At the April (1983) Ukrainian CP Central Committee Plenum, which examined the question "On the Progress of the Implementation of Republic Comprehensive Goal Programs and Measures on the Increase of the Role of the Institutes of the Ukrainian SSR Academy of Sciences and Sectorial Institutes in the Solution of the Problems of Scientific and Technical Progress," the experience of formulating and fulfilling comprehensive goal programs, as well as the active participation of the scientific and technical forces of the republic in the fulfillment of the responsible assignments of the all-union programs as a whole were rated positively. Several impacts, which are characteristic of the set of programs as a whole, are becoming obvious: the possibility to overcome successfully the difficulties of intersectorial barriers, the high technical level of the program results, the shortening (on the average by a factor of 1.5-1.8) of the time for the implementation of scientific and technical innovations, the increase of the scale of the use of innovations up to the level of the complete meeting of the social need for them.

At the same time, both on the scale of the country as a whole and as applied to the experience of the Ukrainian SSR, a number of shortcomings have been identified in the practice of the use of goal program management. For the present not all the assignments of the union, republic, and regional programs are being included in the state plan. On the organizational level the following questions have not been settled: who specifically, by means of what acts begins the formulation, adoption, and implementation of programs; who and in what sequence issues the assignments on them; in what way do organizations become coperformers; what instructions are directive for the performing organizations.

The components of the stimulation of the goal program interaction of the performers of the work are poorly developed. As a rule, organizations are not interested in being participants in some programs or others. The question of the units of the organization of the management of the most important large-

scale programs has still not been specifically decided, there is no system of the responsible appraisal of preplanning developments.

The acceleration of the process of formulating the set of goal programs and subprograms of different levels and types and the more complete use of the scientific and technical potential, which is connected with it, require the settlement of a number of fundamental questions of the improvement of goal program management, which, as is known, is one of the central directions of the improvement of the national economic mechanism of management. It is possible to single out the following as the priority organizational and procedural directions of the improvement of such management.

Any program originates on the basis of the corresponding scientific research, which is conducted by competent scientists who use the methods of forecasting, mathematical economic calculations, and simulation with the use of modern electronic computer equipment. The determination of both the individual (ultimate) and immediate, intermediate goals of the programs is of great importance. The basic research efforts are aimed at the substantiation of the special purpose of the programs and the choice of means and ways, which ensure the achievement of the goals.

It is important to intensify the work which is aimed at the solution of long-range problems, for which it is important to increase the goal-forming role of the Comprehensive Program of Scientific and Technical Progress for a 20-Year Period. One of the basic directions, in which one should work, is the creation of a sound set of versions of the possible goals for the formulation of programs and subprograms, as well as a set of priorities for their choice. At the stage of the formulation of "The Master Plan of the Development and Distribution of the Productive Forces of the Country" and similar plans in the republic this set should be supplemented by versions of the social, production, and ecological goals and should be made more specific from the standpoint of their priorities and the evaluation of their versions for scientific and technical programs.

When formulating "The List of Comprehensive Scientific and Technical Goal Programs," which is envisaged by the existing technology of planning, and when selecting at all levels of management the problems for solution by means of goal programs the tendency for the groundless increase of their number should be resolutely overcome. In themselves the urgency and difficulty of the problem are still an insufficient reason for making a decision on the formulation of the corresponding programs. They should be backed without fail by descriptions which attest to the special (synergetic) impacts, which lend themselves to planning and are expected from the systems integration of the goals and the program organization of the work on their achievement.

When setting the goals for long-term programs and the goal subprograms, which are included in the set of them, it is advisable to use more extensively the approach from the standpoint of the complete life cycle of the technologies which determine the level of the leading works. In this case the goal subprograms can encompass scientific research (goal-oriented basic research), applied research of different disciplines, and special-purpose developments on the multisectorial use of the potential of new advanced technologies. The

assignments for the designers of new enterprises and the goals of the construction, renovation, and change of the organizational structure of works, the training of staffs of workers and specialists, and so on will find their place in such programs. On the organizational methods level this will make it possible to link many programs and goal subprograms of enterprises, sectors of the national economy, and fields of science into a unified system.

The further improvement of the unified state policy of the formation and development of the scientific and technical potential of the country, which is based on the set of corresponding five-year and annual plans of the development of science and its material and technical base, the indicators of which are purposefully oriented toward the assurance of the implementation of the set of goal programs and toward the long-term priorities, which are substantiated in the Comprehensive Program of Scientific and Technical Progress for a 20-Year Period, merits special attention. However, there should be a limited number of high-priority systems.

In the practical activity on the management of the formation and use of the scientific and technical potential one should shift from the traditional accounting evaluations of the state of the potential to problem-oriented evaluations, which characterize the qualitative and quantitative conformity of the system of resources of science to the already existing or long-range goals of their use.

It is important that the financial, material, and technical resources for the implementation of programs would be formed and spent in such a way as to enable the management of programs to shift a certain portion of them (by types of operations and within the limits of the planned period of the implementation of the program). The main organizations of the program should be given the right to create and finance from the general program reserve temporary special-purpose collectives (creative brigades), as well as to use special-purpose individual contracts for the intensification by highly skilled specialists of individual sections of the operations, which limit the program complex.

The effective interaction of programs and plans is of great importance. The solution of this problem depends on the skillful use of modern automated systems of accounting and information processing and the extensive introduction in practice of interactive methods of planning, automated planning systems, and so forth. All this will require the mandatory use of modern information systems of modeling complexes, data transmission systems, computer networks, collective-use computer centers, and so forth.

For the intensification of the use for general program interests of the scientific reserve, research equipment, and experimental production capacities of the coperforming organizations a mechanism of intraprogram cost accounting, which is based on the economic conditions, which are mutually advantageous for them, of the joint and repeated use of the available scientific and technical potential, has to be developed. It will be correct to enlist in the fulfillment of individual operations, as well as in participation in the "competitions for the suggestion and settlement" of some questions or others, which are declared by the program, not only the organizations, the

participation of which in the implementation of the program is envisaged by the plan, but also, in case of necessity, other partners within the framework of mutually advantageous bilateral contracts and agreements.

The role and interaction of several types of organizations, which are legal entities and ensure the implementation of the program: the client of the program who is approved at the highest and most competent level possible on the basis of "The List of Comprehensive Goal Programs"; the designer of the program--an organization which carries out in accordance with a special order and by means of special-purpose additional financing the designing of the program complex of operations; the main ministry (department) and the main organization for the program; the organization which is the responsible performer of the assignment and program; the organization which is the coperformer of the program operations; the organization which is being enlisted in the program operations, need precise legal regulation.

The existing regulations should be improved substantially with allowance made for the gained practical experience. In much the same way as the construction of any building should be preceded by the stage of its designing and the submitting for approval and approval of the design and the choice of the general contractor and the subcontractors, in goal program management the stage of the designing of the program, which is carried out by organizations which have complete and reliable information of a scientific, technical, and organizational economic nature on the future program, is mandatory. Without the availability of a draft of the program, which has been professionally prepared and has undergone appropriate appraisal, it should not be approved, planned, and financed.

The need is arising to use actively for its analysis the information base of the All-Union Scientific and Technical Information Center of the USSR State Committee for Science and Technology on the research and development, which are being conducted in the country and have been completed, specialized information systems, and the information resources of the State Scientific and Technical Information System and the system of party information. The resources of the central organs of the scientific, technical, and patent information system are significantly broader than the currently envisaged obligations on the information tracking of programs and the gathering of the corresponding information which reflects the progress of the implementation of programs. The present level of the technical equipment of these institutions with means of information and computer technology is enabling them to take upon themselves more serious operations, which, in particular, are connected with the keeping of an automated bank of scientific and technical ideas and proposals and the preliminary formation on the basis of scientific and technical forecasts of a list of long-range and short-range goals which are liable to more careful program analysis.

The improvement and standardization of accounting, reporting, and standard organizational goal program documents would contribute to the greatest degree to the formulation and functioning of the set of scientific and technical programs. It is a question of the creation in the future of a standardized set of goal program documents (USPD), in which there should be included, for example, the standardized accounting forms, which have already been developed

at the Institute of Cybernetics imeni V.M. Glushkov of the Ukrainian SSR Academy of Sciences and are being used in practice in the management of a number of programs--the passport of the performer of the assignment of the scientific and technical program and the passport of the scientific and technical program.

For the entire set of programs, which is being formulated, it is important to establish a uniform procedure of providing specific rights and to recommend organizational structural decisions of "the staff units," which ensure the functioning of the management of the program. In different situations various forms of these decisions may prove advisable:

--the delegation of powers with respect to a specific program to a functional organ which is already specialized in production planning activity;

--the functional specialization in the staff functions of the management of the program of people who work in an organizational structural unit which is not engaged in similar functions of day-to-day management;

--the formation of a "headquarters"--a center of the management of the program on the basis of the partial enlistment in this work of a group of scientists and specialists--in the main organization for the program.

Here, of course, the importance of the coordinating councils of the program, scientific and technical councils, and other collective organs, which operate on a voluntary basis, discuss occasionally the progress of matters on the fulfillment of the programs, and on the basis of collective experience map out a general course of actions, is not eliminated and is not belittled. However, there are no grounds to expect that coordination will fulfill the centralized functions of management, which are especially needed by the program. It is appropriate to remind those who are opposed to new organizational decisions in goal program management that the very emergence of goal program management and the increasing interest in it in many ways are due to the shortcomings of the existing systems of management, and in a number of instances to their direct lack of conformity to the solution of important problems under the new conditions of management.

It should be emphasized once again that the appropriate procedural work on the formulation of instructions, statutes, organizational procedures, and other materials, which regulate the work of various categories of performers who are enlisted at all the stages of goal program management, is necessary for the careful development of the "technology" of the devising and implementation of programs.

The entire multilevel, diverse set of performers of the programs (scientific research institutes, design bureaus, problem groups, and so forth) is, in essence, temporarily united collectives which are aimed by the programs at specific end results. Thus, joint work is regulated and evaluated from a uniform standpoint--for the coperformers of programs it is proposed to use a set of unique coefficients of their labor participation by analogy with the brigade method. The "staff organ" of the management of the program develops

the procedure of the current monitoring and implementation of the set of coefficients, enlisting for this competent experts.

In our opinion, it is advisable, on one hand, to simplify as much as possible the procedure of the financing of the fulfillment of assignments in accordance with programs and, on the other, to adapt it to the existing organizational structure of the national economy.

It is possible to regard the inclusion in the program of work with the indication of the performers as an occasion for its automatic insertion in the plans of operations of the corresponding organizations. The statute on the procedure of the formulation of programs should contain a brief definition of some types of them or others, which makes it possible to distinguish the set of operations on the program from the traditional plan of scientific and technical operations.

The terminology should not be complicated: "goal," "comprehensive goal regional," "departmental goal...," and so on, since all programs in their essence are goal and comprehensive programs. The regional nature, departmental nature, and common nature of programs are established on the basis of their content, level, supervision, and problems. The initial names of programs are of a conditional nature, they stimulate the formulation of the technical assignment, which envisages variant (alternative) calculations on a computer (with the use of experiments or special research) of the optimum means of achieving the goals.

In addition to the director of the program, it is desirable to appoint chief designers, who organize the development, designing, engineering studies, and production of machines, devices, and sets of technical decisions. After the approval of the program and the staff organ headed by the director of the program and the chief designer all the design operations in accordance with the assignments of the programs are performed, the collective of performers is selected with the specification of their duties, the procedure of interaction, work contacts, the procedures of the delivery and acceptance of results, the performance of subassignments for each other, and so on.

The elaborated instructions are of a directive nature for all coperformers, regardless of departmental subordination. The formulation of the program requires for the period of the fulfillment of its assignments specific changes of the functional duties of the existing organs of planning and management.

The development and improvement of the goal program approach to the planning and management of the national economy and the gradual transition from the formulation and implementation of individual programs to a set of programs are the main direction in the accomplishment of the tasks facing us of intensifying social production.

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FACILITIES AND MANPOWER

INTERSECTORIAL COMPLEX OF INSTITUTE OF ELECTRIC WELDING

Kiev PRAVDA UKRAINY in Russian 21 Dec 85 p 3

[Article by candidate of technical sciences V.N. Bernadskiy, scientific secretary of the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences, under the rubric "The Return of Scientific Research": "The Potential of Acceleration"; first three paragraphs are introduction by V. Khokhlachev]

[Text] As was already reported, the CPSU Central Committee and the USSR Council of Ministers have adopted a decree on the establishment of intersectorial scientific and technical complexes and measures on the support of their activity. This, it is noted in the document, will make it possible to unite the efforts of various institutions and enterprises, to eliminate departmental isolation in the solution of the most important intersectorial scientific and technical problems, and to strengthen the contact of science with production. The Institut elektrosvarki imeni Ye.O. Patona Intersectorial Scientific and Technical Complex of the Ukrainian SSR Academy of Sciences is the first among the complexes being established. And this is not by chance.

In the half century of its existence the Kiev institute, which is well-known not only in the republic, but also beyond it, has turned into the largest scientific and technical complex in the country, which is conducting priority research and development in the field of welding, special electrometallurgy, and strengthening coatings. This became possible owing to the establishment of its own powerful scientific, design, technological, and pilot production base.

The organizational structure and the system of the management of the complex, which have formed here, served as a kind of model for transfer to other intersectorial technologies and process stages and became the prototype of the intersectorial scientific and technical complexes, which are now being established in the main directions of scientific and technical progress. Candidate of Technical Sciences V.N. Bernadskiy, scientific secretary of the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences, tells about this experience.

The story of the first intersectorial scientific and technical complex in the country should probably begin with its sources--with the "brain headquarters." The institute, which back in 1958 was specified as the main intersectorial organization in the country for welding and to which the supervision of the development of welding engineering of the USSR was assigned, is the scientific nucleus of the complex. Owing in many ways to the active work of the institute our country firmly holds leading positions in the world in this area. The institute also held a leading position in the area of special electrometallurgy. While since 1984 it has also been performing the functions of the main organization for the use of protective and strengthening coatings.

People first of all decide the success of the matter. The institute has a might potential of scientists. Suffice it to say that among its more than 800 scientists there are 10 academicians and corresponding members of the USSR Academy of Sciences and the Ukrainian SSR Academy of Sciences, more than 50 doctors of sciences, and more than 360 candidates of sciences. The institute is successfully performing the role of a forge of scientists and engineers. Here more than 80 graduate students are being trained and the base chair of physical metallurgy of the Moscow Physical Technical Institute operates. The joint educational center with Kiev Polytechnical Institute, which includes the welding faculty of the higher educational institution, courses for the improvement of the skills of welding engineers, and a UN seminar on the advanced training of welding engineers from developing countries, is in operation. The new problem-oriented creative subdivisions of the complex--engineering centers--have also joined in the advanced training of personnel for various sectors of industrial production.

The output coefficient of the institute--7.2 rubles per ruble of expenditures, which attests to the great efficiency of the use of the developments of our scientists--is being achieved by the smooth work of the theoretical and applied "shops"--the scientific and cost accounting subdivisions of the complex. Its own experimental works makes it possible to fulfill promptly the assignments of the institute's departments and laboratories. The experimental design and technological bureau, within which the engineering centers operate, has taken upon itself the development of welding, smelting, and electrometallurgical equipment and the development and introduction in production of individual technological processes. In accordance with its designs the pilot plant of welding equipment produces prototypes and small series of equipment and apparatus. The pilot plant of special electrometallurgy, which does not have analogues, delivers to clients items, materials, and single-design components, which have been produced on the basis of the latest technologies of the institute. In addition to them, in the settlement of Glevakha of Kiev Oblast the institute has a special design and technological bureau for explosion machining, with its own pilot works.

Thus, three most important factors: a significant scientific potential, a powerful pilot production base, and a mobile organizational structure, created the best conditions for the fundamental combination of thorough and goal-oriented basic research with a large number of applied developments which were prepared to the greatest extent for introduction. Previously exclusively "armchair" academic science actively intruded into life. The comprehensiveness of the work being performed, the practically parallel

conducting of scientific research, the development of new technologies and materials, and the designing and production of the necessary equipment substantially shortened the time of the embodiment of ideas in production.

Thus, a little more than 2 years were needed for the development and introduction in the construction of main gas pipelines with a diameter of 1,420 millimeters of the unique Sever mobile pipe-welding complex, which increased labor productivity by six- to eightfold. While the process of the electroslag crucible smelting of metals and alloys, which for the first time in world practice was implemented at the institute on the basis of goal-oriented basic research, after a year was used for the development of new highly efficient low-waste technologies of electroslag chill and centrifugal casting. In a year their large-scale introduction was begun at machine building plants of the country.

There is a very important thing: all these operations were performed in close cooperation with the production workers of the corresponding sectors. This circumstance also ensured a broad geography of the use of the innovations. Now, under the conditions of the intersectorial scientific and technical complex, the union ministries of the machine tool and tool building industry, the electrical equipment industry, chemical and petroleum machine building, and instrument making, automation equipment, and control systems and the USSR State Agroindustrial Committee are becoming our equal partners and coperformers in scientific research and design and technological development. All the institutions and organizations of the complex (and among them are the leading enterprises, scientific research institutes, and scientific production associations of the sectorial ministries) will act in accordance with a uniform plan, which is being drafted by the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences. With the increase of the potentials of the already established scientific and technical complex and with the attachment to it of served organizations and enterprises the academic complex is acquiring an intersectorial nature. Incidentally, in conformity with this principle another academic scientific and technical complex of the republic--the Institut problem materialovedeniya Complex of the Ukrainian SSR Academy of Sciences--is being transformed into the Powder Metallurgy Intersectorial Scientific and Technical Complex of the Ukrainian SSR Academy of Sciences.

The integral system of intersectorial scientific and technical complexes, which are being established on the basis of the experience gained at the Ukrainian SSR Academy of Sciences, signifies a qualitatively new level of the organization of the interaction of science and practice. And this fully accords with the provision of Section V of the second part of the draft of the new version of the CPSU Program, in which the need to constantly improve the organizational and economic forms of the integration of science and production and the management of scientific and technical progress is spoken about.

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FACILITIES AND MANPOWER

KUDINOV ON INTERSECTORIAL SCIENTIFIC, TECHNICAL COMPLEXES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Dec 85 p 2

[Interview with Deputy Chairman of the USSR State Committee for Science and Technology V. Kudinov by SOTSIALISTICHESKAYA INDUSTRIYA special correspondent D. Pipko: "Intersectorial Complexes"; date, place, and occasion not given; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] The CPSU Central Committee and the USSR Council of Ministers have adopted a decree on the establishment of intersectorial scientific and technical complexes and measures on the support of their activity. In the main directions of scientific and technical progress they are called upon to ensure the rapid solution of the most important intersectorial problems. By what has the need for the establishment of such complexes been brought about? What will they be? Today Deputy Chairman of the USSR State Committee for Science and Technology V. Kudinov answers these questions of our special correspondent D. Pipko.

[Answer] In the draft of the Basic Directions of the Economic and Social Development of the Country a vital task is posed: to create such organizational forms of the integration of science, technology, and production, which make it possible to ensure the efficient and rapid passage of ideas from formulation to extensive use in practice. From the experience of past years we know that it is most difficult to fulfill this requirement, when it is necessary to enlist in the solution of the problem organizations and enterprises of several sectors. On the other hand, precisely such problems, as a rule, are of enormous importance for the economy of the country. The goal of the establishment of intersectorial scientific and technical complexes (MNTK's) is to ensure their rapid solution.

It is possible to regard the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences as the prototype of this new organizational form. Over the past years it has been operating as a powerful scientific and technical complex, to which the scientific research institute proper, a strong design and technological bureau, an experimental works, and pilot plants belong. As practical experience has shown, such a combination of subdivisions makes it possible to embody scientific ideas quickly in pilot production prototypes of units and production lines. However, even this collective, in spite of great prestige, experienced significant difficulties,

when it became a matter of introduction, and it was necessary to attach sectorial organizations and enterprises to the work.

[Question] Consequently, is the intention of intersectorial scientific and technical complexes to eliminate the barrier of departmental isolation?

[Answer] Not only that. I would place in the forefront the aspiration to approximate as much as possible the end result: within the complexes scientific ideas should be completely prepared for large-scale introduction. For example, if it is a question of a fundamentally new technology, it is possible to consider the task accomplished only when production prototypes of new units, the necessary auxiliary equipment and systems, and standard plans of new works have been developed. The fundamental structure of the intersectorial scientific and technical complexes was also developed with allowance made for this requirement.

At each complex the main organization--the scientific collective which is capable of offering advanced ideas--should play the leading role. This can be both the entire institute and only the part of it, which is concerned with the given problem. When carrying out the experimental checking and engineering analysis of ideas, this collective will rely mainly on its own design and technological subdivisions and pilot works. For the preparation of the proposed innovations for introduction the intersectorial scientific and technical complexes are permitted to establish engineering and regional scientific and technical centers. Moreover, they can enlist in the work being performed with the rights of participants various organizations and enterprises, which legally will not be a part of the complex. For example, such a complex as the Institute of Electric Welding will now be strengthened owing to the participation of the scientific and production collectives of a number of ministries and departments.

[Question] But this institute, while engaging in the introduction of its own developments, previously also actively cooperated with sectorial organizations, enterprises, and associations. What is the difference?

[Answer] It is no secret that sectorial organizations frequently agree to cooperation with academic institutes and higher educational institutions all but as a favor. Now this issue will be settled without fail. The point is that intersectorial scientific and technical complexes are set up and reorganized in accordance with a decision of the USSR Council of Ministers. It approves the list of organizations and enterprises of various ministries and departments, which are obliged to take part in the work of the complex. All these collectives should operate in accordance with a unified plan which is drafted by the main organization. It will be approved by the USSR State Committee for Science and Technology in consultation with the USSR State Planning Committee and the USSR Academy of Sciences.

Given such an organization of work the monitoring of how promising the solutions proposed by the complex are, will be carried out on the part of the academy of sciences. While the State Planning Committee is called upon to ensure the rapid implementation of the completed developments. On the representation of the USSR State Committee for Science and Technology it will

include in the plans of enterprises of the corresponding sectors the production of prototypes, small series of machines, or test batches of materials. If these innovations give a good account of themselves as a result of tests, assignments on the assimilation of their series production will also be included by the USSR State Planning Committee in the plans of ministries without fail.

Special responsibility is assigned to the main organizations of the intersectorial scientific and technical complexes. They will coordinate all the operations being performed in the country in their scientific and technical direction. The organization and conducting of research and development in accordance with the assignments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries are also assigned to them.

For the successful performance of work within the framework of the intersectorial scientific and technical complexes it is proposed to carry out their priority financing and resource supply. Possibilities for maneuvering are also envisaged. For example, today the orders for material and technical supply are submitted several months before the start of the calendar period. The needs of the intersectorial scientific and technical complexes will be met promptly by the organizations of the USSR State Committee for Material and Technical Supply.

[Question] How many such scientific and technical complexes is it planned to establish and in what directions?

[Answer] At the first stage 16. The question of their establishment was settled subject to the importance of the intersectorial problem and the degree of readiness of the main organization for its solution--the availability of the proper scientific reserve, experience in solving similar problems, the state of the design and technological base and production base. Institutes of the USSR Academy of Sciences, at which ideas of intersectorial importance originate most often, will be the nucleus of the majority of the first intersectorial scientific and technical complexes. For example, in the Reliability of Machines Complex the Institute of Machine Science will play the role of the main organization, in the Light Guide Intersectorial Science and Technical Complex--the Institute of Radio Engineering and Electronics, while in the Biogen Complex--the Institute of Bioorganic Chemistry, which is well-known for its achievements in the area of biotechnology.

There are also "mixed" complexes. For example, at the Laser Technology Intersectorial Scientific and Technical Complex the academy will be represented by the Scientific Center for Technological Lasers, while the Ministry of the Electrical Equipment Industry will be represented by a pilot plant with a design bureau. Along with the Institute of Corrosion of the USSR State Committee for Science and Technology sectorial collectives will also participate in the Antikor Complex, which is called upon to solve the problems of combating corrosion. Finally, a number of such intersectorial scientific and technical complexes as the Robot, Mekhanobr, Rotor, and Petroleum Production Complexes are being set up on the basis of sectorial scientific institutions.

[Question] At what stage can the complexes consider their tasks to be fulfilled? After having prepared the development for introduction?

[Answer] Of course not. They will also direct the very process of introduction, either by directly participating in it or by enlisting sectorial organizations. Moreover, on the basis of intersectorial scientific and technical complexes it is planned to carry out the retraining of the production workers who have to assimilate the new developments. Of course, by enlisting higher educational institutions in the work, the complexes will obtain the opportunity to begin in good time the training of specialists in new directions. A comprehensive approach to the solution of the most important problems of scientific and technical progress will thereby be ensured.

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FACILITIES AND MANPOWER

TEMPORARY SCIENTIFIC, TECHNICAL LABORATORIES

Moscow IZVESTIYA in Russian 13 Jan 86 p 2

[Interview with academician Zh.I. Alferov and Scientific Secretary of the General Physics and Astronomy Department of the USSR Academy of Sciences Ye.V. Trushin by B. Konovalov under the rubric "The Key Task Is Introduction": "The Effect of Temporary Laboratories"; time and place not specified]

[Text] Academician Zh.I. Alferov tells about the new form of work of academic science.

We frequently have occasion to encounter situations, when a scientific idea and some development originated in our country, but industrial embodiment was developed much more rapidly abroad. This especially often concerns academic works. And, in my opinion, both industry and science are to blame for such situations.

A system of main institutes, which have become in practice everywhere monopolists in their field, is in effect in the sectors in our country. This monopoly frequently gives rise to indifference, sluggishness, and slowness. Where, they say, are we to hurry? No one will surpass us--there are no competitors. Indeed, competitors remain only abroad. And it is always possible to find an "explanation" as to why things go quickly for them, but slowly for us. When work comes to such monopolists from outside, from academic science or science of the higher educational institution, most often a sense of jealousy comes into play, and this hinders the matter. But even if they do take a development, the matter advances "at a snail's pace."

This is one side of the coin, while the other is the characteristic shortcomings of academic developments. To all the reproaches with the slow development of the matter the specialists of the sector justly reply: But what have you turned over to us--an unfinished development, a mock-up, a laboratory technology? It is necessary to work and work on it. And in this they are right. Therefore, not by chance is it recorded in the draft of the Basic Directions: "To strengthen the technical orientation in the work of academic institutes."

This problem is difficult and diverse. It has many solutions. In my opinion, one of the partial, but quite effective ones is the establishment of temporary scientific and technical laboratories at academic institutes.

A specific style of work and psychology of scientific associates formed over many decades in academic science. Ambition in the good sense of this word was always one of the powerful stimuli. To be the first to express an idea, to discover an effect, to publish an article, to suggest versions of application--this creates a name and respect in the academic environment. But technical development is considered a matter without prestige. Therefore, at present the ordinary associate believes that engrossment in technology will take place to the detriment of his interests, frankly speaking, instead of seeking new discoveries and obtaining fundamentally new knowledge he will deal with a secondary matter.

Let us say frankly that the basic task of academic institutes, indeed, first of all consists in the obtaining of fundamentally new knowledge and in the "introduction" of new ideas among scientific and technical personnel. Priority in this matter is of enormous, including practical, state importance. If before foreign scientists we discovered a new phenomenon, developed a theory, understood the essence of some process, and before others "put" all this into the heads of our engineers, such introduction of new technical ideology is often more important than the development of specific instruments. And we still need to learn to appraise this properly.

But it is justly said that a picture is worth a thousand words. And very often it is possible to convince industry, only having produced models of new equipment, which are suitable for real work. While the authors themselves can do this best of all.

Not only a powerful technological base, which the majority of academic institutes do not have, but also powerful stimulation of the work itself are needed for the accomplishment of important state tasks. And you will not change the situation by orders or administrative measures. Stimuli are necessary in order to force the author of a new idea, even though it is to the detriment of his basic work, to drive the matter, as they say, home.

Temporary laboratories, which the Section of Physical, Technical, and Mathematical Sciences of the Presidium of the USSR Academy of Sciences proposed to establish, are also needed for this. One of the first and the largest temporary laboratory was established at the Leningrad Physical Technical Institute of the USSR Academy of Sciences under our Department of Contact Phenomena in Semiconductors.

We also worked earlier on economic contracts. Industry is willingly using our works, because the semiconductor heterostructures, in the study of which our collective holds a leading place in the world, in many ways govern the future of microelectronics and optoelectronics, the use of solar energy, the development of very high-speed computers, and other most important directions. We assigned to the temporary laboratory specific and important jobs for industry on the element base of fiber optic communications lines, having

concluded an economic contract with one of the enterprises, which took upon itself the financing.

According to the statute, it was possible to pay the associates of the temporary laboratory a 30 percent wage increment, and at the end in case of the fulfillment of the assumed obligations a substantial bonus. This should have become a reward to scientific associates for the fact that they would develop not laboratory mock-ups of instruments, the reliability and technological feasibility of which is very low, but models, which satisfy industry and are capable of functioning in the operating complex. This proved to be profitable to the enterprise, with which the contract was concluded, because it sped up the process of the development of equipment on a new element base, on the one hand, and gave impetus to the development of this work in the electronics industry, on the other.

It must be said that at academic institutes, as a rule, there are many very skilled junior scientific associates, who are "past their prime" and whom, as much as you would like to, you cannot make senior scientific associates--there are no rates. Now such an opportunity appeared. And the increment was paid in accordance with their position in the temporary laboratory, and not in the permanent laboratory. It was possible to pay more than the wage to people who do not want to spend time on defending a dissertation, preferring to devote all their efforts to work. But the main thing is that it is possible to promote young people.

In the 3 years, which were fixed for the existence of the temporary laboratory the task was fulfilled and specific work was performed for industry. At the same time it turned out that this temporary laboratory was of enormous benefit for all the permanent laboratories, and now there are already five of them in our department. Everywhere the technological level of research increased sharply. The bottlenecks, which tormented us for long years, now were quickly "undone," and these technological achievements became generally accessible.

Of course, there were also several complicated factors. An associate of the permanent laboratory comes to you and complains: I have a family, children, I perform no less important work, but receive less than a recent undergraduate. This situation caused some complications in the moral climate of the department. But it cannot be helped. We agreed to the deliberate stimulation of work in a scientific and technical direction which was very necessary for the country at the given moment.

As a whole the experiment proved to be very positive and useful. And now we are again establishing a temporary laboratory. In my opinion, this matter is important and merits extensive state support.

Scientific Secretary of the General Physics and Astronomy Department of the USSR Academy of Sciences Ye.V. Trushin summarizes.

In 1981 eight temporary scientific and technical laboratories (VNTL's) for the acceleration of the introduction of the results of scientific research in the national economy were organized by a joint decision of the USSR State Committee for Science and Technology and the USSR Academy of Sciences. Of

them five were established at institutes of the General Physics and Astronomy Department of the USSR Academy of Sciences.

Now the experiment has been completed, and it is safe to say that it was a success. At all the institutes the planned goals were achieved, while the use by industry of the obtained results has already yielded a large economic impact. Thus, at the temporary scientific and technical laboratory for the development of computer assemblies, which was organized at the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences, the planned work was fulfilled in 2.5 years. The developed computer components were used by industry, and a real economic impact of more than 15 million rubles has already been obtained. The collective of developers was awarded the Prize of the USSR Council of Ministers for 1984.

At the Institute of Metal Physics of the Ural Scientific Center of the USSR Academy of Sciences the temporary laboratory engaged in the development of a set of means of the nondestructive testing of the welds of arch-welded pipes. The time of the introduction of the results of experimental design work as compared with the usual method was shortened at least to one-half. The new units have been introduced at six metallurgical and pipe plants, while the economic impact from the use of just one of them exceeds 200,000 rubles a year.

At the Institute of Solid-State Physics of the USSR Academy of Sciences the temporary scientific and technical laboratory was aimed at the problems of the technology of means of communication. It was of great importance for magnetic recording systems. The magnetic properties of the developed items exceed by two- to threefold, while their wear resistance exceeds by three- to fivefold the present level in the country.

The temporary laboratory of the Institute of Applied Physics of the USSR Academy of Sciences in Gorkiy was established for the rapid growing of single crystals. Here the scientific principles of the technological process were successfully developed and models of equipment for the rapid growing of large single crystals were produced. The introduction of the new technological process, for example, at the Monokristall reaktiv Scientific Production Association of the Ministry of the Chemical Industry made it possible to shorten by tens of times the time of the production of optical components. Previously about 1.5 years were spent on the growing of crystals of the required size, while according to the new technology only a few weeks are.

As a whole the experiment was a success.

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TRAINING AND EDUCATION

MOISEYEV ON SCIENCE, REFORM OF EDUCATION

Moscow KHIMIYA I ZHIZN in Russian No 11, Nov 85 pp 79-81

[Chapter from the book "Slovo o nauchno-tekhnicheskoy revolyutsii" [A Word on the Scientific and Technical Revolution] by academician Nikita Nikolayevich Moiseyev: "'Education and Science--Unity or Opposition?'"; first four paragraphs are KHIMIYA I ZHIZN introduction]

[Text] The name of academician Nikita Nikolayevich Moiseyev is well known to the readers of KHIMIYA I ZHIZN--his statements on the pages of the journal have always been devoted to the most urgent problems of the development of our country and all modern civilization. The new book of N.N. Moiseyev "Slovo o nauchno-tekhnicheskoy revolyutsii" [A Word on the Scientific and Technical Revolution], which was published on the threshold of the 27th CPSU Congress by the Molodaya gvardiya Publishing House (Moscow, 1985), is also exceptionally urgent.

The book was published in an edition which for already about 50 years now through inertia they like to call large--an entire 100,000.... "In the book computers are also spoken about, but it is directed first of all toward social problems," it is directly stated in the author's foreword. Moiseyev warns that he does not agree either with those who foresee the end of the world due to the scientific and technical revolution or with those who simply believe that "everything will somehow turn out right."

Obviously, for this reason the first section of the book contains the statement of a matter, which the author considers one of the most important in today's world and calls "The Program Teacher." Moiseyev argues that "now, as never before, a clear conception of man and a program of its implementation are necessary. But the behavior of man, the nature of his thinking, and the structure of education are a very conservative sphere of social life. Generations are needed for 'The Program Teacher' to yield appreciable results. That is why it, 'The Program Teacher,' perhaps, is the most urgent of all the problems which have been posed by the scientific and technical revolution for mankind...." These opinions of the author have something directly in common with the tasks of not only the reform of the secondary school, but also the serious reorganization of higher and secondary specialized education, which are being heard more and more persistently in party decisions.

Before us is a chapter from the section "The Program Teacher" of the book of academician Nikita Nikolayevich Moiseyev "Slovo o nauchno-tekhnicheskoy revolyutsii."

A quite specific system, in which higher educational institutions have been grouped separately and scientific research institutes have been grouped separately, has formed in our country. Mainly sectorial and academic institutes are engaged in research, higher educational institutions are engaged in training. Is this good or bad?

It is impossible to give an unequivocal answer. At one time not only training, but also basic research were conducted within the walls of higher educational institutions. This tradition to date is very strong in the West. But in the past 30-40 years many research organizations, which are not directly connected with higher educational institutions, have also emerged there. Large corporations and the state are establishing them. Commercial research centers are also emerging. There is a definite reason for this. And the Soviet Union was the first one who began to establish such a system of specialized scientific research institutions. At the dawn of Soviet power the famous Central Institute of Aerohydrodynamics--the heart of the Soviet aviation industry and science--was established on the initiative of N.Ye. Zhukovskiy. Other research centers, which ensured the progress of domestic industry, were also established.

However, there are not only advantages in the system which formed in our country. Let us direct attention to the fact that the most significant portion of the people, who have academic degrees and titles, work at higher educational institutions, while basic research is being done outside higher educational institutions. And there is another trend--the most talented young scientists are rushing from the higher educational institution to the scientific research institute, and fewer and fewer prominent researchers and designers are engaging in teaching. As a rule, not a researcher, but a "staff instructor" teaches the student who has to engage in research. Hence, as a result of the formed system "not the very best" are teaching students.

These circumstances, which are disturbing in themselves, turn into a real danger, when it becomes a matter of the training of personnel in the "hot" directions, to which the scientific and technical revolution has given rise.

If an instructor of descriptive geometry or the strength of materials does not perform intensive scientific work, there will be no great trouble from this. At least 100 years ago this knowledge, which an engineer needs, was completely canonized. But if a person, who is not participating himself directly in such activity, supervises the graduation project of a specialist in laser engineering or the computer-aided system of aircraft designing, this is really dangerous.

Instruction should be easily adapted to new trends. But it is possible to do this only when a person, who is himself in the front line of science, teaches the student. The scientific and technical revolution requires the close connection of science and instruction, but barriers have arisen between them! How are they to be overcome?

Much has already been written about this. I am convinced that today the system, which has been adopted at the Moscow Physical Technical Institute, is a quite satisfactory solution of the problem within the framework of the established system of the division of science and education. (Footnote 1) (At the Moscow Physical Technical Institute there are nine faculties--from physical and quantum electronics to aeromechanics and flight engineering. Two of them have a bearing on the possible interests of the young readers of KHIMIYA I ZHIZN: molecular and chemical physics and physical chemical biology. Attention, the entrance examinations, just as for Moscow State University, are in July--editor's note) The idea of the system of our Moscow Physical Technical Institute is very simple. There are a specific number of base scientific research institutes which are responsible for the training of specialists in the same way as the Moscow Physical Technical Institute itself is. Starting with the 3rd year the students spend a portion of their time at these base scientific research institutes--from 3 to 5 days a week. At the research institutes lectures on special subjects are given to them, they work in the laboratories, the same laboratories in which the science and technology of tomorrow are being created, they take part in the planning work of the scientific research institutes.

This is very advantageous for research institutes. They have not only additional scientific personnel: they are given the right of the first choice of specialists. The base scientific research institutes receive not only the best graduates of the Moscow Physical Technical Institute, but also trained researchers, since the students have already worked for 4 years on the themes of the scientific research institutes. The "tune-up period" of a young specialist, which usually takes about 3 years, has been reduced by the system of the Moscow Physical Technical Institute to zero.

They say that our system is very expensive. From the standpoint of the financial administration of the Ministry of Higher Education it undoubtedly is. The point is that our system is oriented toward the individual training of the student and, hence, requires a larger number of instructors than ordinary flow-line training. One of the workers of the ministry said to me that for the money, which is being spent on one student of the Moscow Physical Technical Institute, it would be possible at university N to train three applied mathematicians.

I do not know what kind of mathematicians they are training there. I only know that at university N there is no computer base and it is completely out of touch with any research in this area. And, perhaps, having trained one student of the Moscow Physical Technical Institute, we have done the state a service if only by the fact that university N did not train three applied mathematicians.

I believe that in such financial calculations it is necessary to reason differently. It is possible to calculate how much the "tune-up period" of a young specialist, who has been instructed not in what is needed for work at a scientific research institute and not as is necessary, costs. And to subtract this amount from the money which is spent on a student of the Moscow Physical Technical Institute. Then we will obtain the real rubles which are being

spent on him. And they will be completely different than the ones which were counted in the financial administration of the ministry.

But the system of the Moscow Physical Technical Institute is not the only and, I believe, not a universal alternative. The system of contracts (economic contracts) with industry exists. It makes it possible to enlist students and instructors in active research or planning activity. For this work the client pays the higher educational institution money, including the wage. But here is the difficulty--this wage is strictly limited. Each higher educational institution has the right to take on a volume of work for an amount which does not exceed a certain limit. But now the tendency to reduce this limit has also appeared.

There are many reasons which are forcing this to be done. But let us consider the political economic meaning of such actions. For they signify the deliverate decrease of the social productivity of labor. I am not speaking of the fact that students and instructors are being deprived of the opportunity to join in research.

Of course, it is also possible to understand the arguments which financial workers advance, when limiting the work on economic contracts. Such work on contracts increases the real wage which instructors receive. But its rejection signifies the decrease of the amount of labor, which is being performed by citizens of our country. It is necessary, apparently, to seek means of the commodity compensation of this additional wage, and not to reduce administratively the amount of socially useful labor.

I will note that in the West the system of contracts is very widespread. It is also the basic means which enables instructors to remain at the level of current knowledge and to join in the research activity of future specialists starting with the student years. And the fact that the successful fulfillment of a contract guarantees the instructor's wage, which significantly exceeds the usual university salary, does not worry anyone.

Strictly speaking, such a situation is also forming with the combining of jobs. Much has also been said about this in our press. And again those, who object to the combining of jobs, for some reason first of all worry that a certain portion of the specialists will receive a larger wage. And they even add up the additional expenditures. But I believe that the calculations, which are usually cited, do not stand up to any criticism. For at present we should have a double complement of skilled scientists, one at higher educational institutions, and the other at scientific research institutes! What country is capable of this?

And not only this. In nearly all the capitals of the union republics and other cities, where there are few scientific research institutes, the professors are in charge of the departments of the scientific research institutes, while assistant lecturers give lectures instead of them.

Such is reality, and it is necessary to take it into account before beginning to calculate. And it is necessary to calculate in a different way. Let us merely note that the wage rates of a professor and a bus driver are

approximately the same. And very few wage rates of drivers would be needed for skilled specialists, who work at research and planning institutes, to begin again to teach students.

The requirement of the unity of research and instruction is an urgent requirement of the scientific and technical revolution!

I believe that the Ministry of Higher Education is not capable of solving the set of problems which we are discussing here. And not because the ministry is working well or poorly. Here, so it seems to me, everything is more complicated. In practice feedback is absent in the structure which carries out the training of personnel. Indeed, the system of the training of personnel trains specialists, but other systems: the national economy, administration, science, and so on, use them. And years should pass before it will become possible to evaluate the quality of these specialists. But what does the word "quality" mean in this situation? What is good here and what is bad?

It seems to me that there can be only one approach to evaluation: how capable the specialist is of meeting the demands of society on the strengthening of his homeostasis. This becomes clear by no means immediately! Not by chance are the authority, reputation, and prestige of a higher educational institution, scientific school, or chair created over decades.

Therefore, when encountering some difficulties or others, the management staff of the ministry can easily surrender to the temptation "to do things a little more simply." And they resign themselves to the fact that assistant lecturers give the basic lectures, although skilled professors are working nearby in the same city. It is easier for it to do this than to enter into difficult and lengthy discussions with the Ministry of Finance on the increase of "the wage rates of drivers." But what comes of this becomes clear only after several years, when the graduates begin practical work.

It seems to me that extradepartmental expert commissions--permanent collegiums and groups of advisors, which are subordinate only to the highest organs of power--are necessary here. The decision of these collegiums should have after their approval the force of law.

I would not like to go into further details. I saw my task in showing what new problems the scientific and technical revolution is posing in the area of the training of personnel and to express confidence that with some change of the existing procedures of decision making these problems can be solved. There are no real obstacles here!

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PATENTS AND INVENTIONS

TASKS OF STATE COMMITTEE FOR INVENTIONS, DISCOVERIES VIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 49, Dec 85 p 14

[Article by TASS correspondent B. Lyanov for EKONOMICHESKAYA GAZETA under the rubric "Mighty Acceleration for Technical Progress": "What Is in the Portfolio of the Inventor?"]

[Text] The new material, which was developed by scientists of the Institute of Chemical Physics of the USSR Academy of Sciences, is not inferior in hardness to diamonds. The abrasive pastes based on titanium carbide, which one of the enterprises has begun to produce, have already provided a saving of about 130 million rubles.

Another invention--the now well-known Bulat units--also quickly found their way into practice. They were developed at the Kharkov Physical Technical Institute of the Ukrainian SSR Academy of Sciences on the basis of a fundamentally new method of the surface hardening of materials. The Moscow All-Union Scientific Research Institute of Tools immediately undertook to use this invention in its sector. The joint work of the people of Kharkov and Moscow led to the appearance of a new method, by means of which it became possible to strengthen drills, cutting tools, and milling cutters, increasing their life by two- to threefold. Each Bulat unit annually saves about 130,000 rubles.

"These are just two examples of the great efficiency of new developments," Chairman of the USSR State Committee for Inventions and Discoveries I.S. Nayashkov said to a TASS correspondent. "The total economic impact from the use by the national economy of inventions and efficiency proposals annually amounts to about 7 billion rubles. I have in mind only their primary use. Unfortunately, matters with the circulation of inventions are not that satisfactory. In a number of cases the scale of their use is confined to the framework of only those institutes and enterprises, at which they were developed. It is also impossible to regard as normal such a situation, when industry adopts only one-third of the inventions which have been developed for the first time.

"The party and government are taking vigorous steps to change the situation in a revolutionary way and to activize all the economic life of the country. The draft of the Basic Directions of USSR Economic and Social Development for

1986-1990 and the Period to 2000 attests to this. In it, in particular, the importance of creating the necessary conditions for the most rapid introduction in the national economy of inventions and efficiency proposals is emphasized.

"At present the State Committee for Inventions and Discoveries jointly with the State Committee for Science and Technology and the USSR Ministry of Justice is working on a draft of a law on inventions. We expect that this document after the appropriate discussion by the community and the making of additions to it will be adopted and will serve the stimulation of not only invention, but also the introduction of the achievements of innovators in the national economy.

"The policy of revolutionary changes in the economy and in all economic activity of the country requires the determined reform of the style and methods of work of the State Committee for Inventions and Discoveries. We should give ministries more effective organizational and procedural assistance and specify the priority directions of scientific and technical research, which promise the greatest economic advantages. The most valuable information on everything new that has been developed in domestic and world practice is concentrated in our hands. It should become a criterion when evaluating the technical level of products which both are being designed and are being produced.

"Among the tasks facing the State Committee for Inventions and Discoveries there is also such a task as the utmost acceleration of the delivery of patent information to the developers of new equipment, technology, and materials. An information service, which makes it possible in compact form and in the shortest time to deliver to the consumer the data of interest to him on the inventions made in the world, has been established.

"A system of remote access to data banks, by means of which the developer of new equipment can literally in a few minutes read on the display screen everything about the innovation that interests him, has also undergone experimental checking. Both of these systems have been set up and are operating, but their efficiency leaves much to be desired. We are now working on the elimination of these shortcomings. Ministries and departments should take more vigorous steps on the improvement of the use of high-speed patent information systems. It must not be forgotten that the acceleration of scientific and technical progress is most closely connected with how promptly the developer of new equipment receives all the necessary information on the new things which are appearing in world practice.

"One of the tasks, which the committee has to accomplish, concerns the increase of the quality of the expert appraisal and the shortening of the time of the consideration of applications. In this respect much work, the results of which should contribute to the rapid introduction of inventions, lies ahead of us. There are still instances when enthusiasts develop something new, but the expert commission refuses to issue a certificate of authorship to them. Mistakes of the expert commission? Yes, unfortunately, it also happens that way, because both unconscientious and insufficiently skilled workers are found among the experts. We, of course, are taking steps--we are depriving those to

blame for a mistake of the bonuses, are imposing penalties, and sometimes even dismiss such people. But statistics show that the groundless refusals to issue certificates of authorship make up from 1 to 4 percent of the total number of positive decisions. In the remaining cases the expert commission did not make a mistake. What is going on? It turns out that locally the patent search was made poorly and unskillfully. The state expert commission discovered that a similar technical solution had already been registered. It turns out that the application documents had been drawn up entirely incorrectly, but the application is a legal document on which special and entirely legitimate demands are made.

"Such misunderstandings occur because either the patent service, if such a service exists at all at the enterprise, works poorly or the developers of new equipment themselves do not have the necessary skills and knowledge, while there is no one to help them.

"Practical experience shows: if proper attention is devoted to invention on the part of economic managers, refusals to issue certificates of authorship rarely occur in such organizations and make up no more than 5-10 percent of the total number of submitted applications for inventions. The Leningradskiy Metallicheskiy zavod Production Association, the Tallinn Production Association of Radio Electronic Equipment, the ZIL Production Association, the Institute of Electric Welding imeni Ye.O. Paton, and the All-Union Scientific Research, Planning, and Design Institute of Metallurgical Machine Building can serve as an example of this. At these enterprises and institutes not only are the patent services strong, but the developers themselves have been provided with the necessary knowledge and have undergone specialized training in the system of the State Committee for Inventions and Discoveries. At the Tallinn Production Association of Radio Electronic Equipment, for example, all the leading designers are obliged to obtain a specialized patent education, otherwise, as they justly believe at the enterprise, they cannot conform to the held position.

"Invention has vast reserves," I.S. Nayashkov said in conclusion. "Now, on the eve of the 27th CPSU Congress, we should put them to use in the shortest time, which will have a very significant influence on the acceleration of scientific and technical progress in our national economy."

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PATENTS AND INVENTIONS

NAYASHKOV ON DRAFT OF LAW ON INVENTIONS, DISCOVERIES

Moscow IZVESTIYA in Russian 4 Jan 86 p 2

[Interview with Chairman of the USSR State Committee for Inventions and Discoveries Ivan Semenovich Nayashkov by IZVESTIYA science commentator B. Konovalov under the rubric "From Competent Sources": "Invention: The Breaking of Barriers"; date, place, and occasion not given; first paragraph is IZVESTIYA introduction; capitalized passages printed in boldface]

[Text] An interview with Chairman of the USSR State Committee for Inventions and Discoveries I.S. Nayashkov on the draft of "The Law on Inventions, Discoveries, Production Prototypes, and Efficiency Proposals."

[Question] Ivan Semenovich, to what is the need for the writing of this law attributable?

[Answer] We live in a rapidly changing world. The laws should keep pace with the times and reflect the large-scale changes which are occurring in the life of our society. The acceleration of scientific and technical progress is now assuming an enormous role for our country. And the writing of the new law should stimulate technical creativity and improve the mechanism of the relations among everyone who is taking part in the development and implementation of inventions and discoveries.

Let us immediately say that all the basic principles, which were introduced by Lenin's decree of 1919, in our opinion, should be retained in the new law. The exclusive right to an invention, as before, should belong to the state. In socialist society this is the only correct solution. In bourgeois countries a patent, which gives inventors the right of exclusive ownership, is issued to them. In our country the basic protective document is the certificate of authorship. And it is necessary to retain this situation.

At the same time the need also exists for the creation of conditions for the more efficient use of inventions. In our country an invention is universal property. Any enterprise can use it freely. This seems to be good. No one interferes with the payment and forces anyone to pay "an exorbitant price" for the use of an invention, which promises a large profit. But there is also the reverse side of the coin--IT IS POSSIBLE NOT TO USE AN INVENTION. At present

in our country no one bears responsibility for this. And the state, as the "owner" of an efficient invention, in this case incurs large losses.

So the main thing that is proposed in the draft of the new law is to change this situation: specific enterprises and organizations should be made legally responsible for the use of a specific invention and at the same time an economic interest in this should be created.

Let us immediately stipulate that the law being prepared, of course, does not presume the 100 percent use of all registered inventions. Not everything that has been invented should be introduced--this is a correct formula. Abroad, for example, the commercial use by firms of patents comes to only about 10 percent. The remainder are used mainly as "protection" against competitors. In our country this factor does not exist, but the main factor--economic expedience--remains. It makes sense to introduce only those inventions, which will repay with interest the expenditures on the inevitable reorganization of production and will improve substantially the consumer qualities of the goods in which they will be implemented. Introduction should be profitable for the state and for the enterprise which has to use the invention.

In the Soviet Union 150,000-180,000 applications are submitted annually for proposed inventions. If even a fourth of them are recognized as inventions and certificates of authorship are issued for them, it is impossible to introduce such a number. Then our industry will be all the time in a state of permanent renovation. Therefore, in the proposed draft it is a question of the attachment to enterprises of the most important inventions.

The total economic impact from the introduction of innovations now amounts annually in our country to 7 billion rubles. Efficiency proposals account for nearly half of them--3.8 billion rubles. Each of them in itself is not of great importance, but an enormous number of them are being submitted--approximately 4 million efficiency proposals a year. As a rule, they are used quite rapidly by enterprises without special inducements, and there is no need to set up special state control over these proposals.

Major inventions are another matter. Of the remaining half of the economic impact from the introduction of innovations only about 3,500 most important inventions account for a significant amount--1.6 billion rubles. It is necessary to keep their fate under control and to aid their implementation.

[Question] Does this infer that the enterprise, to which the invention should be attached, acquires along with the author a kind of right of ownership?

[Answer] No. The state retains the exclusive right to the invention. The enterprise will merely be as if the conditional "owner." The rights of the manager are turned over to it and responsibility for the use of the invention is assigned to it. In essence, this is approximately the same situation as when an enterprise receives a new machine tool and bears fully the responsibility for its preservation and efficiency of use.

Today's difficulties in many ways are explained by the fact that the author receives a substantial reward, if his invention is used, while the enterprise itself does not have any special advantages. Except that 1.5 percent of the economic impact is allocated to the staff members who directly participated in the introduction of the invention. At present the enterprise does not receive anything from the very implementation of an invention in an item and the improvement of its consumer qualities, although for the changeover to the output of a new product it is necessary to carry out the most difficult and agonizing reorganization of production. Frequently this also gives rise to the reluctance to introduce inventions.

Therefore, it is proposed to change the situation radically and to see to it that the enterprise, which took upon itself all the difficulties of the initial introduction of the invention, could retain the additional profit for the material stimulation of the collective. Then this will create the necessary interest in the introduction of inventions in the entire labor collective, which in practice always takes part in the process of changing over to the output of new products.

Moreover, it is advisable that the trailblazing enterprises would cover the expenses on introduction from special centralized funds of the ministries. For the introduction of innovations frequently entails the taking of risks, and it is necessary to decrease its degree for the collective which is setting to work on introduction.

[Question] Will such attachment of inventions and increased stimulation of the trailblazing enterprise not have the result that introduction will be isolated? This is, after all, our main trouble today. According to the estimates of specialists, 80 percent of the new developments for the present are being introduced at only 1 enterprise, less than 20 percent are being introduced at 3 or 4, and only 0.6 percent are being introduced at 5 and more works. In what way is it proposed to increase the scale of introduction?

[Answer] One must not underestimate the importance of initial introduction. When an invention has been introduced, this demonstrates most convincingly that there is no risk and everyone can use it at ease, which is of great psychological importance for those who follow the trailblazers closely. And then state planning levers and again economic levers should come into play. The enterprises, which will change over to the output of new products starting in 1986, should receive a surcharge for this. The new pricing and stimulation for the output of new equipment envisage an increase of the wholesale price by 1.25 percent as compared with the old wholesale price. The example of the "trailblazing enterprise" will give a guarantee of the receipt of this surcharge. Thus, in my opinion, all this will be a quite powerful stimulus to the extensive circulation of innovations.

[Question] Very often the promising idea of an author is "realized" only on paper, while it is necessary, of course, to offer the enterprise at least an operating model. But the inventor, as a rule, does not have such a possibility, provided this is not planned work in his specialty. Is any assistance to inventors at the stage of the demonstration of the feasibility of his idea now envisaged?

[Answer] We are suggesting that a special invention introducing center, which has its own departments in various regions of the country, would be established under the USSR State Committee for Inventions and Discoveries. This center should have design and technological subdivisions for experimental operations. We would recommend to this center inventions, which have been approved from the point of view of world novelty and the estimated economic expedience, but have not yet been materialized, as they say, in metal. In the subdivisions of the invention introducing center they would be embodied in metal, would be tested, and then would validly be turned over to enterprises with a much smaller degree of risk for practical use.

Industrial ministries today, given the overloading with planning operations, in practice cannot take upon themselves this "mission of risk," therefore, the need has arisen for the establishment of a special organization. Then the doors for technical creativity would be opened much more widely, and the situation of young people, who are making the first attempts in this field, would especially be made easier. This would be of very great importance for various types of inventions for daily life, which for the present, unfortunately, most often remain "homeless."

[Question] You, apparently, have more than once had occasion to be faced with the complaints of inventors of the difficulties of obtaining the reward from enterprises. Is this circumstance taken into account in the draft of the law?

[Answer] Responsibility for the groundless delay of the payment of the reward to the creators of new equipment is envisaged in the draft of the new law. The following version is proposed: if the enterprise exceeds the established deadline, it should pay the authors a kind of "forfeit"--3 percent a year of the due amount of the reward. The procedure of paying the rewards should also be simplified.

We also propose not to limit the "ceiling" of the rewards for especially outstanding inventions and discoveries. Let us say frankly that there are very few of them. Such inventions as, for example, the laser appear rarely and are of most immense importance. So why cheat the authors?

[Question] We have been speaking all the time about stimulation, but in life not those who help the inventor, but, on the contrary, those who hinder him, frequently have the decisive say. Does the draft of the new law propose any responsibility for the unjustified refusal of an inventor and unscrupulous criticism which has hindered introduction?

[Answer] Attention is being directed to this. Administrative fines for the hindering of the registration of inventions and the unjustified delay of the payment of rewards are envisaged in the draft. Criminal proceedings will even be able to be instituted for bureaucracy and red tape. But all the same we are relying more not on administrative steps, but on new stimuli and the interest of enterprises. And this is not only the position of our state committee.

We gathered for the discussion and preparation of the draft of the law executives of 24 ministries, honored inventors, and the aktiv of the All-Union

Society of Inventors and Efficiency Experts and received many suggestions. The final version of the draft of the law was sent to approximately 100 ministries and departments, we are already receiving responses. So the work on the draft of the new law is of a collective nature.

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PATENTS AND INVENTIONS

ECONOMIC IMPACT OF DECREASING NUMBER OF INVENTIONS

Moscow PRAVDA in Russian 7 Jan 86 p 2

[Article by Doctor of Economic Sciences V. Obukhov (Moscow): "Invent and Use. Accelerate Scientific and Technical Progress"]

[Text] In the number of annually registered inventions our country since 1974 has held first place in the world. The economic impact from their use in the past 20 years has increased by more than twentyfold, while the number of Soviet licenses, which are being sold to foreign firms, has increased by fifteenfold.

The achievements, as we see, are unquestionable. At the same time, if we evaluate the state of affairs in invention in light of the decisive tasks of the intensification of the economy of the country during the 12th Five-Year Plan and the period to 2000, it will become obvious that this area of scientific and technical creativity requires improvement. For the more effective inventions are developed and used, the higher the basic economic indicators are. Therefore, it is quite legitimate to examine the results of the practical activity of individual ministries in interconnection with their attitude toward invention.

Let us take the ministries which figured at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress among the sectors which are not using properly the reserves of the increase of production efficiency--the USSR Ministry of Ferrous Metallurgy, the USSR Ministry of the Construction Materials Industry, the USSR Ministry of the Petroleum Refining and Petrochemical Industry, the USSR Ministry of the Chemical Industry, and the USSR Ministry of Nonferrous Metallurgy. How are things going for them in the area of invention during the first 4 years of the past five-year plan?

It turns out that the number of applications for inventions in 1984 as against 1981 in all these sectors declined: for the Ministry of the Chemical Industry by 28.8 percent, for the Ministry of the Petroleum Refining and Petrochemical Industry by 19 percent, for the Ministry of Ferrous Metallurgy by 17.6 percent, for the Ministry of Nonferrous Metallurgy by 14.6 percent, and for the Ministry of the Construction Materials Industry by 13.3 percent. There were also fewer decisions on the issuing of certificates of authorship

for inventions. With respect to these ministries the number of used inventions and the economic impact from their implementation decreased. The average amount of the economic impact per invention also decreased sharply (in the Ministry of the Construction Materials Industry to five-eighths). These indicators clearly characterize the contempt for invention, the latest equipment and technology, and, in the end, the intensification of production. From where are the successes of the economy to come?

The amount of the economic impact to a large degree depends on the scale and time of the introduction of truly new equipment which is based on inventions. But precisely these conditions are being poorly observed.

Specialists of the Donetsk Scientific Research Institute of Ferrous Metallurgy (Donetsk) developed a new technology which is protected by five certificates of authorship for inventions. It makes it possible to decrease the consumption of coke by 11-15 percent with the constancy of the furnace output and the quality of the pig iron. It was introduced 5 years ago only at the Donetsk Metallurgical Plant with an annual economic impact of 1 million rubles. Meanwhile the increase of the scale of its use would have made it possible to increase the amount of the impact by tens of fold.

Another technological development of this institute, which contains seven inventions, is being used at the Zhdanov Metallurgical Combine imeni Ilich and the Yenakiyevo and Dneprodzerzhinsk Metallurgical Plants with a total annual economic impact of more than 2 million rubles. But in case of large-scale introduction it would yield a saving of about 50 million rubles.

Other technical innovations wait for years even for isolated implementation. The State Scientific Research Institute of Nonferrous Metals developed the process of autogenous blast smelting, which makes it possible to use raw materials completely and eliminates the need to use coke. In 1979 the initial data for designing were issued, the design of the furnace was also completed. However, its construction is being delayed--there is no oxygen station, which they should have put into operation long ago.

Incidentally, there are many similar examples not only in ferrous and nonferrous metallurgy, but also in other sectors. Who is responsible for this? First of all the management personnel of ministries and departments, who have been invested with the rights and duties to see to the technical progress of production.

As a consequence of the worsening of invention the steady tendency for the value of the indicators, which characterize patent and license work, to decrease has emerged in the ministries in question. Thus, the number of inventions, which were sent for foreign patenting, in 1984 as against 1981 decreased for the Ministry of the Construction Materials Industry to two-fifteenths, for the Ministry of Ferrous Metallurgy to one-fourth, and for the Ministry of Nonferrous Metallurgy to ten twenty-thirds. The number of licenses, which were sold in 1984 by the Ministry of Ferrous Metallurgy, the Ministry of the Construction Materials Industry, and the Ministry of Nonferrous Metallurgy, was at the 1975 level, while the Ministry of the Petroleum Refining and Petrochemical Industry and the Ministry of the Chemical

Industry sold in 1984 respectively one-tenth and one-fifth as many licenses as in 1975.

As we see, the reduced attention to inventing, patent, and licensing questions immediately turns into the worsening of the economic indicators. For if there are no appreciable gains in the acceleration of scientific and technical progress, there are also no socioeconomic results which are particularly felt.

It is to be deplored, but it is a fact that many managerial personnel of economic organs of management are poorly acquainted with the questions of invention, the prevailing statutes in this area, and the peculiarities of patent and license work and, therefore, are not attaching proper importance to the most productive area of technical creativity. At the organizations and enterprises, which are subordinate to them, the subdivisions, which are in charge of invention and patent and license work, are weak. Either there are no experimental bases at all, at which inventors could develop new technical approaches, or they do not meet even the minimum needs. At times they look at an inventor not as a champion of technical progress, but as an annoying obstacle in work and life. But if they are supposed to pay him the due reward for the used innovation, they strive to understate the economic impact in order to decrease the amount of the payment. They are as if being economical in the interests of the state, but in reality are doing it harm, by checking the development of invention and, thus, also the acceleration of technical progress.

In the system of the USSR State Committee for Inventions and Discoveries there is the Central Institute for the Improvement of the Skills of Management Personnel and Specialists of the National Economy in the Area of Invention and Patent Work. It seems that it would be worthwhile for the management personnel, who deal with questions of scientific and technical progress, but are not very experienced in patent work, to attend a series of lectures at this institute. If only in such subjects as the economics and planning of invention. I am confident that after this it will be possible to expect a sharp increase of the number of implemented inventions and the increase of the economic impact from their use.

Since the ultimate goal of all inventing activity is to obtain the maximum economic or other positive impact from the implementation of new technical approaches, a priority task is arising--to achieve a high growth rate of this impact during the 12th and subsequent five-year plans. Here much also depends on the USSR State Committee for Inventions and Discoveries. Unfortunately, in the committee there is no main unit of economic scientific and practical thought--a unit for the analysis and interpretation of the national economic results of its activity as an organ which determines inventing, patent, and license policy in the country. Apparently, there should be returned to the All-Union Scientific Research Institute of Patent Information (VNIIPI) the prefix "and technical and economic research," which for some reason was "cut off" of it at the end of the 10th Five-Year Plan. The questions of the economics of invention should be the main unit, after the taking up of which it is possible to pull out the entire chain with the minimum material expenditures.

A special question concerns the work of the All-Union Scientific Research Institute of State Patent Appraisal (VNIIGPE). The annual appraisal of nearly 150,000 applications for proposed inventions is a very labor-consuming and expensive matter. One should think over already now how to speed up and decrease the cost of appraisal and to improve the selection of the most advanced technical approaches in order to use them more rapidly and extensively.

In the first half of the 1960's a new, so-called delayed system of appraisal appeared in the world. In the socialist version in the GDR, while in the capitalist version in the Netherlands. The author of these lines studied both versions in Holland and the GDR. The essence is simple: an expensive appraisal is made not of all applications for inventions, but only of those, with respect to which, obviously, protective documents should be obtained in one's own country or abroad. The remaining applications are laid out at the patent library, as is customary to say, for general review. In this connection a new patent term arose--"the laid out application," which is a temporary (up to 7 years) protective document which protects the essence of a technical approach and the priority of the applicant. "Innovations," which are not especially advanced technically and economically and in which no one has displayed an interest and has not demanded their appraisal, simply remain "old maids," at the rank of laid out applications, dying a natural death after the expiration of the established term.

In the past 20 years, in addition to the GDR and the Netherlands, many other countries have also changed over to the delayed system of appraisal. Has not the time come also for our country to express its attitude toward the new economical, effective system of the appraisal of applications? Moreover, to develop and use its own variant, which conforms to the present requirements of the acceleration of scientific and technical progress. Yes, qualitative and timely appraisal is needed. But it is needed for the prompt recognition as inventions of only those significant technical approaches, the use of which in the national economy promises an appreciable economic or other impact today or in the very near future. While the remaining applications will be laid out "for general review."

What will all this yield? First, the scientific and technical appraisal of significant technical proposals will be carried out more rapidly, moreover, by the most skilled experts. This will increase its quality with a decrease of the total expenditures on appraisal as a whole. Second, the weight of the certificate of authorship for an invention will increase. Finally, it will induce developers to a full creative return and the development of truly new, highly efficient equipment which is competitive on the world market.

Given the best organization of invention scientists, designers, engineers, and leading workers, who are enthusiasts of mass technical creativity, will be able to make a more significant contribution to the progress of production and the increase of its economic efficiency.

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INCREASING THE EFFECTIVENESS OF AGRICULTURAL PRODUCTION

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 8, Aug 85 pp 12-22

[Article by V. Klyuy, candidate of economic sciences]

[Abstract] The Ukraine is among the most important agricultural regions of the Soviet Union. The overall production of agricultural products during the tenth 5-year plan was 28.5 billion rubles, 47 percent greater than in 1960-1965, the productivity of labor being 89 percent higher. Some 207 scientific research institutes, agricultural schools and experimental stations are involved in investigations of agricultural problems in the Ukraine. Important elements of scientific and technical progress in agriculture include the utilization of proper crop rotation and improvement of the structure of planted areas. Industrialization of agriculture will be a major factor in improving yields. Utilization of the achievements of science and technology and agriculture represents a powerful means of increasing the economic effectiveness of agricultural production.

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INTERNATIONAL S&T RELATIONS

COOPERATION WITH CEMA COUNTRIES IN SCIENCE, TECHNOLOGY

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 85 pp 30-35

[Article by V. Primachenko, chief inspector of the International Relations Administration of the Ukrainian SSR Academy of Sciences: "The Scientific and Technical Cooperation of the Socialist Countries"]

[Text] In the Declaration of the Basic Directions of the Further Development and Intensification of the Economic, Scientific, and Technical Cooperation of the CEMA Member Countries, which was adopted at the Economic Summit Conference in Moscow in June 1984, it was noted that the joint activity of the socialist states is called upon under present conditions "...to contribute to the mobilization of the potentials of the countries and the strengthening of their mutual cooperation for the purpose of the dynamic and harmonious development of the economy of each country and the entire community...on the basis of the all-round intensification of production and the introduction of the world achievements of scientific and technical progress." (Footnote 1) (PRAVDA, 16 June 1984)

In the solution of the outlined problems an important place belongs to cooperation in the field of science and technology. Here qualitatively new tasks, which are connected with the need for the increase of the role of scientific and technical cooperation, the strengthening of its influence on the process of socialist economic integration, and the introduction of the achievements of science and technology in production, are being placed in the forefront. The 1970's were a period of the primarily extensive development of scientific and technical cooperation. The number of themes of joint research and the number of cooperating organizations increased. But this was not accompanied by the necessary qualitative changes in the very mechanism of cooperation and was not always coordinated with the processes of intersectorial and intrasectorial cooperation. At present the center of gravity is shifting to the sphere of joint activity which is aimed at the quickest introduction in production of the achievements of scientific and technical progress. As General Secretary of the CPSU Central Committee M.S. Gorbachev noted in his report at the April (1985) CPSU Central Committee Plenum, precisely scientific and technical progress acts "...as the main strategic lever of the intensification of the national economy and the better use of the gained potential." (Footnote 2) (PRAVDA, 24 April 1985)

Much attention is being devoted in the CEMA countries to the examination of the question of how to place integration cooperation in the service of the new tasks. The questions of the development of cooperation in the field of science and technology and of its influence on the rate of the further acceleration of scientific and technical progress were discussed at the 35th meeting of the CEMA Session (June 1981). Its participants noted that the greatest reserves of the intensification of the national economies, as well as of the intensification of integration are contained in scientific and technical progress. It was deemed necessary to carry out the gradual changeover to the planning of cooperation, which encompasses the stages of the conducting of joint research and development and the introduction of the obtained results in production, and to ensure a fundamental interconnection when solving scientific, technical, production economic, and trade problems. In this connection it was recommended to the CEMA member countries to take steps, which are aimed at the preferential development of cooperation in the creation of advanced technologies, equipment, and new materials on the basis of agreements (contracts) with the precise regulation of the mutual obligations of the parties for the obtaining in the shortest time of scientific and technical results with the creation of the necessary conditions for the extensive development of contractual cooperation and direct relations between the performing organizations, as well as the rapid development and introduction of the results which have been obtained during cooperation.

At the 36th meeting of the CEMA Session (June 1982) the decision was made to supplement the coordination of plans with the coordination of economic, scientific, and technical policy and to strengthen the multilateral approach to the most important problems of cooperation.

The policy, which is aimed at the item-by-item examination of the key, priority questions of scientific and technical progress and the cooperation of the CEMA member countries in the area of science and technology, was continued at the 37th meeting of the CEMA Session (June 1983). The completion of the lengthy and careful preparation for the economic summit conference of the CEMA member countries was the main result of the Session.

The Moscow Summit Conference, which was held in June 1984, gave new impetus to the further expansion and intensification of the cooperation of the CEMA member countries in the area of science and technology. The conference, in the work of which the leaders of the Communist and Workers Parties and the heads of the governments of the countries of the socialist community took part, noted that cooperation in the area of science and technology and the increase of its effectiveness should become one of the key tasks and directions of socialist economic integration. Emphasizing the importance of scientific and technical progress for the intensification of the economy, the participants in the meeting specified the basic directions of the combining of joint efforts. In the interests of the concentration of forces and assets on the most important, most promising directions of science and technology it was decided to formulate the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries for 15-20 Years. It will make it possible to pursue a coordinated scientific and technical policy in such basic directions as electronics, complete automation and mechanization, atomic

energy, the development of new types of materials and technologies, and biotechnology.

The successes in the area of science and technology are creating realistic prerequisites for the further acceleration of the pace of scientific and technical progress in the CEMA member countries. Thus, 3,600 new models of high-performance machines, equipment, and means of automation are developed and introduced in production annually in the USSR. (Footnote 3) (See O. Bogomolov, "Scientific and Technical Progress in the USSR and Its Foreign Economic Aspects," ARGUMENTY I FAKTY, No 30, 1983) In 1983 in the country there were approximately 24,000 inventions and about 4 million efficiency proposals, 3,700 new types of machines, equipment, instruments, and materials and a number of highly efficient technological processes were assimilated. On the basis of the further increase of labor productivity the labor of 3.5 million people was saved and 88 percent of the increase of industrial output was obtained. (Footnote 4) (See V. Kudinov, "The Soviet Union on the March of the Five-Year Plan," EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV, No 7, 1984, p 51) In the GDR the planned tasks in the area of scientific research and development and their introduction in production as a whole were accomplished. In 1983, 5,500 descriptions of new items and technological processes were assimilated, for the national economy as a whole 545 million working hours were saved, which corresponds to the labor during the year of 300,000 workers. (Footnote 5) (See A. Donda, "The Results of the Development of the GDR National Economy," EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV, No 7, 1984, pp 39-42) The use of the achievements of scientific and technical progress in the CSSR, which found expression in completed scientific developments and introduced inventions and efficiency proposals, made it possible during 1983 to save 434,000 tons of standard fuel, as well as raw materials and materials worth 2.3 billion kronas and 110,000 tons of metal. A relative saving of the labor of 21,155 workers was obtained. (Footnote 6) (V. Micka, "The CSSR National Economy in 1983," EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV, No 7, 1984, p 53) Definite gains in the acceleration of scientific and technical progress were also achieved in the other countries of the socialist community.

As was already noted, at present the extensive and rapid introduction in production of the results of scientific and technical research and development is becoming the basic trend in the development of the scientific and technical integration of the CEMA member countries. The organizational forms of this activity are diverse and have a specific nature in each of the cooperating countries. But all of them are aimed at the increase of the effectiveness of the use of the achievements in the area of science and technology. Thus, specialized introducing organizations, which, without replacing scientific production associations, combines, scientific research institutions, and design bureaus, promote the extensive and rapid introduction of the obtained results, have been formed in a number of socialist countries.

Definite experience of such activity has been gained in Bulgaria. Here the broadening and intensification of economic initiative, the extensive use of cost accounting methods of management, and the regulation of interrelations with the client on a contractual basis are a characteristic feature of the work of engineering introducing organizations (IVO's). The development and

introduction of new equipment and technology and the study and dissemination of advanced foreign know-how belong to the powers of the engineering introducing organizations. In 1982 in Bulgaria there were more than 300 such organizations; more than a third of them are sectorial research and planning institutes and design bureaus. The bulk of them operate within the framework of economic organizations, which makes it possible to coordinate the work of the engineering introducing organizations with the needs of a specific works. At present in Bulgaria preference is being given to the uniting of academic scientific research organizations, scientific research organizations of higher educational institutions, sectorial scientific research organizations, and engineering introducing organizations into unified centers. Such, for example, is the Progress Rapid Introduction Center (TsUV), on the staff of which there are about 100 people. At present it has to its account the introduction of such developments as the Telekard System for the transmission of electrocardiograms over long distances, a new technology of the centrifugal casting of pipe, floppy magnetic disks for memories, and others. In 1982 the economic impact from the activity of the Progress Rapid Introduction Center came to 17 billion levs. (Footnote 7) (See A. Khachaturyan, "Organizational Forms of the Integration of Science and Production," EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV, No 7, 1984, pp 77-79)

In Hungary at the same time as the constant transformation of the structure of scientific research institutes introducing organizations are being established in the form of scientific production associations, engineering consultation enterprises, and others. NOVEX, which was established in Hungary, has about 50 people. Such developments, which have yielded a significant national economic impact, as a separator for the treatment of industrial sewage, electronic level gauges, and others were introduced with its assistance. (Footnote 8) (Ibid., p 79)

The decree of the USSR Council of Ministers "On the Further Improvement of the Cooperation of Ministries and Departments of the USSR, Associations, Enterprises, and Organizations with the Corresponding Organs, Enterprises, and Organizations of the Other CEMA Member Countries in the Area of Science, Technology, and the International Specialization and Cooperation of Production," (Footnote 9) (See SOBRANIYE POSTANOVLENIY PRAVITELSTVA SSSR, No 21, 1981, p 122) by which the changeover of this activity to a contractual (contract) basis is envisaged, was an important step in the direction of the intensification of the participation of the Soviet Union in the scientific and technical cooperation of the CEMA member countries. It is being implemented in conformity with the existing international and national enforceable enactments and recommendations of CEMA organs, and the development and the organization of the production of new machines, equipment, materials, and technological processes on the basis of specialization and cooperation are its goal.

In 1984 the decree of the USSR Council of Ministers on measures on the creation of the necessary conditions for the development of international production and scientific production intrasectorial cooperation and on the improvement of direct contacts between the ministries, departments, associations, enterprises, and organizations of the USSR and the other CEMA member countries was adopted. In conformity with it the all-union industrial

associations, enterprises, and organizations of the USSR are the basic units, which conduct direct production, scientific, and technical relations with enterprises and organizations of the other CEMA member countries for the joint development of stable, long-term, and mutually advantageous production. The decree envisages the economic stimulation of the indicated units for the increase of their interest in the development of international intrasectorial cooperation and the acceleration of the introduction in the national economy of the results of joint research. (Footnote 10) (See A. Barkovskiy, "Through Direct Contact," IZVESTIYA, 9 August 1984)

In recent years such organizational forms of the integration of science with production as sectorial technological centers, complex scientific research institutes, scientific and technical complexes attached to higher educational institutions, and academic scientific and technical associations have been undergoing development in our country. The suggestion on the creation of special institutions, which could assume the functions of middlemen between academic institutes, sectorial scientific research organizations, and industrial enterprises, merits attention. The establishment of a network of general contracting scientific and technical organizations, which specialize in the introduction of scientific and technical results, could serve this. (Footnote 11) (See "Sotsialnyye i ekonomicheskiye aspekty povysheniya effektivnosti sovetskoy nauki" [The Social and Economic Aspects of the Increase of the Efficiency of Soviet Science], Moscow, 1982, pp 64-78; Ye.N. Bliokov, "The Introduction of the Achievements of Academic Science in Practice," VESTNIK AKADEMII NAUK SSR, No 8, 1984, pp 37-43)

Definite experience in the introduction of the results of scientific and technical research and development has been gained at the Ukrainian SSR Academy of Sciences. The works of Ukrainian scientists have made it possible to establish such new sectors and directions as special electrometallurgy and powder metallurgy. New technological processes, equipment, systems, and means of automation have been developed and introduced extensively in the national economy. The further improvement of the goal program methods of the management of scientific research and experimental design operations is being carried out. The experience of the Ukrainian SSR Academy of Sciences in the increase of the efficiency of scientific research, the development of advanced technologies, and the implementation of the USSR Food Program has three times (since 1976) received the endorsement of the CPSU Central Committee. In conformity with the task "...to ensure the increase of the effectiveness of research work, the active contribution of collectives of scientists to the large-scale introduction of the achievements of science in production," which was formulated in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983), (Footnote 12) (KOMMUNIST, No 13, 1983, p 20) scientists of the Ukrainian SSR Academy of Sciences are not limiting themselves to the introduction of developments at individual enterprises, but are performing this work on the scale of the sector. During the years of the 10th Five-Year Plan 3,325 works with an economic impact of 1.5 billion rubles were introduced in various sectors of the USSR national economy. (Footnote 13) (See B. Paton, "The Strategy of Research," RADYANSKA UKRAYINA, 4 July 1981) To a significant degree the presence at the Ukrainian SSR Academy of Sciences of an experimental design and production base, which

at present unites 72 organizations and more than half of all the workers of the Academy of Sciences, is contributing to this.

One of the main directions of the activity of the experimental design base is the shortening of the period of time from the origination of a scientific idea to its implementation and the increase of the degree of readiness of developments for introduction in production. For this purpose scientific and technical complexes (NTK's), which include: the institute proper, a design bureau, a pilot or experimental works, and a pilot plant, have been set up at the largest institutes of the Ukrainian SSR Academy of Sciences (the Institute of Electric Welding imeni Ye.O. Paton, the Institute of Cybernetics imeni V.M. Glushkov, the Institute of Problems of Material Science, the Institute of Superhard Materials, the Physical Technical Institute of Low Temperatures). In performing the entire cycle of operations, starting with the conducting of basic and applied research and experimental design work and ending with the development of a series-produced model, which is ready for transfer to production, the scientific and technical complexes are an example of the effective integration of science and production. The experience of their establishment at the Ukrainian SSR Academy of Sciences was recognized as very effective at the conference in the CPSU Central Committee on questions of scientific and technical progress. (Footnote 14) (See M.S. Gorbachev, "Korennoy vopros ekonomicheskoy politiki partii" [A Vital Question of Party Economic Policy], Moscow, Politizdat, 1985)

In recent times special problem-oriented subdivisions, which received the name engineering centers, have been formed on the basis of several scientific and technical complexes (the Institute of Electric Welding imeni Ye.O. Paton, the Institute of Cybernetics imeni V.M. Glushkov, the Institute of Superhard Materials). They ensure the successful conducting of goal-oriented basic research in the most important directions of scientific and technical progress, the increase of the level of developments, and the prompt introduction of their results on the scale of many sectors. The engineering centers are concerned with the thorough study of the needs of the national economy for technological and technical developments; the determination of the sectors in which their results can be used; the production by their own forces or on the basis of cooperation of single models and test series of the latest equipment, instruments, and materials; the preparation of planning and design documents for the large-scale introduction of the latest technologies; the provision of scientific, technical, and consultative assistance to ministries, production associations, and enterprises in the determination of the technological policy of introduction, the assimilation and use of innovations, the establishment of service subdivisions, and others.

The activity of the engineering centers is making it possible to shorten significantly the time of the development and introduction in production of a number of materials, technologies, and high-performance equipment, which do not have analogues in domestic and world practice and make it possible to increase labor productivity, the quality of items, and the reliability and performance of the assemblies of domestic components and structures and to decrease the materials-output ratio. (Footnote 15) (B. Paton, "Engineering Centers," PRAVDA, 3 January 1985)

It is well-known that the level of the research and development, which have been completed in the course of scientific and technical cooperation, in many ways depends on the level of the national scientific research institutions and organizations which are taking part in the work being performed. The availability at the Ukrainian SSR Academy of Sciences of a large-scale experimental design and production base, as well as the concentration of the scientific and technical potential on the development of the priority directions along with the extensive use of means of automation and computer technology are making it possible to use most completely the advantages of the international socialist division of labor. The institutions of the Ukrainian SSR Academy of Sciences are carrying out cooperation with scientific research institutes and organizations of the CEMA member countries, using such advanced forms of cooperation as the conducting of joint research within the framework of the Coordinating Centers of the CEMA member countries and the problem commissions of multilateral scientific cooperation of the academies of sciences of the socialist countries and the performance of research on the basis of cooperation and coordination on themes, which have been approved by the bilateral intergovernmental commissions for scientific and technical cooperation, as well as have been included in the problem and thematic plans of scientific cooperation of the USSR Academy of Sciences and the academies of sciences of the other socialist countries for a 5-year period.

In the matter of improving the mechanism of international scientific and technical cooperation there are still a number of unsolved problems, including problems of the organizational and procedural level. Their solution is necessary for the increase of the effectiveness of scientific labor. Thus, so far generally recognized methods of measuring the economic efficiency of scientific and technical cooperation, including performed scientific research and experimental design development as one of its forms, have not been developed, which is creating certain difficulties for the objective evaluation of the obtained economic impact of each of the cooperating countries. The most general formulation of the criterion when determining the efficiency of international scientific and technical cooperation is the decrease of the expenditures of time on research and development and on the introduction of their results in industry. (Footnote 16) (See M.N. Osmova, "Sotsialisticheskaya ekonomicheskaya integratsiya i effektivnost proizvodstva" [Socialist Economic Integration and Production Efficiency], Moscow, Politizdat, 1975, p 60) In case of multilateral cooperation the economic impact for each of the parties ideally is measured by the gain, which consists in the recovery of the expenditures made by the country and the share of the impact obtained by all the parties to cooperation. (Footnote 17) (See M.S. Ilin, D.A. Lebin, and V.A. Prokudin, "Effektivnost nauchno-tekhnicheskikh svyazey stran SEV" [The Effectiveness of the Scientific and Technical Relations of the CEMA Countries], Moscow, "Mysl", 1979, p 195)

It is extremely difficult to measure the effectiveness of basic and theoretical research, although its enormous influence on the overall development of science and technology is incontestable. The practical implementation of the results of such research can occur after a lengthy period of time and can find expression not so much in the production of specific items as in the appearance of new directions of science and technology and in the overall stimulation of scientific and technical

progress. It is impossible to speak about the possibility of decreasing the time and assets for the conducting of basic research (as some authors believe) if only because frequently they are simply unknown. In case of the conducting of basic research it is difficult to fix specific times of the performance of individual types of operations. The constant change of the previously fixed deadlines as research progresses is typical of them. At the same time the development of basic science should hold a priority position. "Precisely it acts as a generator of ideas, makes breakthroughs into new areas, and provides an outlet to a new level of efficiency." (Footnote 18) (M.S. Gorbachev, "Korennoy vopros ekonomicheskoy politiki partii," p 19)

When developing quantitative methods of determining the economic efficiency of scientific and technical cooperation the basic attention is devoted to applied research and development, which are directly connected with production. In "Outlines on the Criticism of Political Economy" F. Engels wrote that "...given a reasonable system...the spiritual element, of course, will belong to a number of components of production and will also find its place among the production costs in political economy. And here, of course, we discover with a sense of satisfaction that the work in the area of science is also rewarded materially, we discover that just one such fruit of science as the steam engine of James Watt gave the world during the first 50 years of its existence more than the world from the very start has spent on the development of science." (Footnote 19) (K. Marx and F. Engels, "Soch." [Works], Vol 1, p 555)

In this case the increase of the productivity of the socially necessary labor is the basic criterion of the determination of the economic efficiency. This increase, in the opinion of some authors, (Footnote 20) (See, for example, S.I. Stepanenko, "The Determination of the Economic Efficiency of the Scientific and Technical Cooperation of the CEMA Countries," IZVESTIYA AKADEMII NAUK SSSR (EKONOMIKA), No 5, 1979, p 93) can be fixed: a) in the sphere of research and development (the preproduction stage) and express the saving of expenditures of labor, which was obtained by the participating parties when carrying out scientific research activity itself; b) in the corresponding sectors of production (the production stage) and express the saving of expenditures of labor, which occurs in case of the introduction of the results of research and development in production. At the same time "...to date the economic efficiency of cooperation is being evaluated only in the sphere of the production stage as the result of the introduction of scientific and technical results (new equipment). As to the preproduction stage, at which scientific research and planning and design research were carried out by the use of one form or another of scientific and technical cooperation, it, as a rule, was not taken into account and the impact was not determined." (Footnote 21) (Ibid., pp 93-94)

The methods of determining the efficiency of the introduction of the results of applied research in production, which exist in the CEMA member countries, differ from each other, while the comparison of the impacts obtained in the different countries (even if they were determined in accordance with a uniform method) is complicated owing to the lack of realistic exchange rates of currencies. (Footnote 22) (See A.N. Bykov, "Nauchno-tekhnicheskaya integratsiya sotsialisticheskikh stran" [The Scientific and Technical Integration of the Socialist Countries], Moscow, "Mezhdunarodnyye

otnosheniya", 1974, p 91) Consequently, the economic efficiency of international scientific and technical cooperation, which has been measured at the national level, is of a relative nature.

Certain reserves of the increase of the efficiency of scientific and technical cooperation and the improvement of its mechanism lie in the more active and extensive use in practice of advanced forms of joint activity and the uniting of science with production. Today it is already impossible to develop mutual cooperation effectively without the active inclusion in integration processes of the associations, enterprises, organizations, and institutions of the CEMA member countries. The establishment of direct contact and the setting up of joint firms and enterprises are the means of improving the economic mechanism of cooperation, which was approved by the participants in the Economic Conference in Moscow in June 1984.

The establishment of direct contacts and the signing in April 1985 in Kiev of an agreement on scientific cooperation between the Ukrainian SSR Academy of Sciences and the Polish Academy of Sciences for 1986-1990 are a direct consequence of the practical implementation of the decisions of the conference. During the next 5-year period the institutions of both academies will conduct by joint efforts scientific research in such directions as solid-state physics, geophysics, power engineering, molecular biology, hydrobiology, environmental protection, and others. Certain steps are being taken in the establishment of joint organizations.

Movement along the path of scientific and technical progress and the most complete use in production of the results of cooperation in the area of science and technology is inseparably connected with the acceleration of socioeconomic development as a whole.

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REGIONAL ISSUES

REGIONAL COMMITTEES FOR SCIENCE, TECHNOLOGY NEEDED

Yerevan KOMMUNIST in Russian 15 Dec 85 p 2

[Article by Honored Figure of the Higher School of the Armenian SSR K. Ter-Mkrtichyan and Docent of Yerevan Polytechnical Institute S. Akopyan under the rubric "The Policy of the CPSU: Acceleration, Initiative, Responsibility. We Are Discussing the Precongress Documents of the Party": "Establish Regional Committees for Science and Technology"; capitalized passages published in boldface]

[Text] In the draft of the Basic Directions the tasks of the economic and social development of the country are clearly formulated and the specific means of their accomplishment are named. The accomplishment of "a radical change in the intensification of production on the basis of the use of the achievements of science and technology," as is indicated in the draft, is the main direction of development.

The responsibility of the higher school, to which a significant role belongs in the molding of personnel who are called upon to implement the most important function of combining the achievements of the scientific and technical revolution with the advantages of the socialist social system, for the fate of scientific and technical progress has also increased. Now at higher educational institutions more than half of the scientists of the country are concentrated, a third of the themes being studied in scientific subdivisions are being elaborated, and the most important problems of national economic significance are being solved.

In this connection the efficient organization of the contact of science of the higher educational institution with production, which will make it possible to implement the scientific idea promptly, is extremely important.

THE EXISTING ORGANIZATIONAL STRUCTURE OF THE MANAGEMENT OF THE SCIENTIFIC ACTIVITY OF HIGHER EDUCATIONAL INSTITUTIONS, IN OUR OPINION, IS NOT PERFECT AND IS NOT CONDUCIVE TO THE FULL OUTPUT OF ITS POTENTIAL.

A large portion of the completed developments are finding use by only individual clients--there is no large-scale introduction. This is explained by the fact that the plans of scientific research are formed mainly from the

orders of individual organizations with the stipulation of the implementation of its results at a specific object.

The performance of scientific research at a modern level depends on the stock of high precision measuring instruments, general-purpose laboratory stands which control and regulate devices, the necessary materials--the appropriate material and technical base. Many of these components are not available at the higher educational institution, which leads to the dragging out of the time of research, unproductive expenditures of time, and so on. PRACTICAL EXPERIENCE SUGGESTS: IT IS NECESSARY TO ESTABLISH FOR HIGHER EDUCATIONAL INSTITUTIONS A SPECIAL SYSTEM OF EXPRESS DELIVERIES IN ACCORDANCE WITH THE ORDERS OF SCIENTISTS.

The planned scientific theme should be dictated by one sector or another, moreover, figuratively speaking, THE DATA BANK ON THE PROGRAMS BEING FULFILLED SHOULD BE CONCENTRATED AT A SINGLE COORDINATING CENTER OF THE GIVEN ECONOMIC REGION.

Scientific research in the republic is being performed in the system of institutions of the Academy of Sciences, sectorial institutions, and the Ministry of Higher and Secondary Specialized Education. THE EXISTING ORGANIZATIONAL STRUCTURE OF THE MANAGEMENT OF SCIENCE IN THE REPUBLIC DOES NOT HAVE THE POSSIBILITY TO COORDINATE EFFICIENTLY THE WORK OF THESE UNITS. The lack of coordination of forces and assets is occurring, which to a significant degree is decreasing the return. There is no single center which would unite all the scientific subdivisions in the republic regardless of their departmental affiliation.

Life and practical experience suggest: the coordinating center should be united and be given all powers, namely: the right of the formation of scientific centers; temporary scientific and scientific production collectives; the financing of operations; the creation of a material and technical base for the implementation of ideas, as well as should have the right to ensure the introduction of the results of research at the base enterprises of the corresponding sector.

THE STATE COMMITTEE FOR SCIENCE AND TECHNOLOGY ATTACHED TO THE REPUBLIC COUNCIL OF MINISTERS IS APPEARING AS SUCH A UNITED SCIENTIFIC COORDINATING CENTER. All scientific research institutes, design bureaus, special design bureaus, and industrial enterprises irrespective of their departmental subordination should be subordinate to it. It will check the questions of the choice of themes, the means and deadlines of the fulfillment of assignments, the implementation of the results of research, and the stimulation of the performers.

Specialized commissions made up of prominent scientist-specialists for the study and formulation of the tasks of primary and basic necessity for the specific sector should operate under the proposed coordinating center.

The coordinating center should accumulate a data bank (with the extensive use of automated information systems) in accordance with the materials on the sector, which have been submitted by the commissions, and distribute the

solution of these problems among scientific and sectorial subdivisions, allocate assets and material resources, and ensure the effective cooperation of the collectives of scientific institutions, the higher school, and the sectors of the national economy.

At one time such a center operated in the republic, but, unfortunately, was abolished. The division of science into academic science, the science of higher educational institutions, and sectorial science characterizes emphatically the existence of departmental diversity in science and, consequently, as if validates the necessity of departmental barriers.

Science is unified just as the goals pursued by it are well-defined and are aimed at the implementation of advanced forms of the development of society.

In our opinion, a unified form of the coordination of scientific research and experimental design work with all the ensuing circumstances should exist.

The extensive discussion of the precongress documents and the study of the imposing program, which has been set by the party for the Soviet people, are providing a stimulus to seek and find the optimum versions of the solution of the most important problems of the acceleration of scientific and technical progress. We are certain: the revival of the activity of the State Committee for Science and Technology in the republic is a real necessity.

We consider it necessary in the second section of the Basic Directions of USSR Economic and Social Development for 1986-1990 and the Period to 2000 to add to the words "To intensify the integration of science and production, to improve the organization and shorten the time of the development and assimilation in the national economy of scientific discoveries, technical innovations, and inventions" the words "TO ESTABLISH STATE COMMITTEES FOR SCIENCE AND TECHNOLOGY IN THE REGIONS OF THE COUNTRY, HAVING ASSIGNED TO THEM RESPONSIBILITY FOR THE SOLUTION OF THESE PROBLEMS."

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REGIONAL ISSUES

ASSISTANCE FOR KIRGIZTORGMASH ASSOCIATION IN WELDING

Frunze SOVETSKAYA KIRGIZIYA in Russian 27 Dec 85 p 3

[Unattributed article under the rubric "The Scientific and Technical Progress Page. The Search": "Before Inventing the Bicycle"]

[Text] In the preceding "The Search" page (SOVETSKAYA KIRGIZIYA, 26 November) in the report "Alone With the Problem?" the factors, which are hindering the main plant of the Kirgiztorgmash Association in Sokuluk from accomplishing the assignments of the comprehensive program on the acceleration of scientific and technical progress and eliminating the "bottlenecks," were discussed. In particular, one of the managers of the association complained that here they are struggling with the mechanization of the dressing of welds when assembling food cookers. In the collective they have also been dreaming for a long time about the introduction of multiple-projection resistance welding.

One of the difficulties of the problems touched upon lies in the fact that it is a question of operations with stainless steel, from which the so-called jackets of the cookers are made. But this material is manufactured at not all the enterprises of the republic. The editorial office appealed to the Academy of Sciences and a number of other institutes of the republic to give the addresses, at which they could help the trade machine builders in this matter. Scientists responded to the request of the newspaper. But the Agricultural Machinery Plant imeni Frunze, which was named among the first by the executives of the Institute of Physics, fell short of the expectations of the people of Sokuluk.

Yu.S. Nikishin, chief welder of the plant, would have been glad to help his colleagues, but at the Agricultural Machinery Plant, with stainless steel "they do not deal, while flat parts not of a spherical surface undergo spot welding." The Elektrik Plant of the USSR Ministry of the Electrical Equipment Industry in Leningrad, at which, in the words of physicists, automatic multiple-projection welding machines should be produced in series, was the second address. But once again, the specialists note, it is difficult to guarantee conformity to the demands which are made in this case on the welds--tightness and strength. In items of the food industry they are, of course, special.

They gave us more realistic information at the inquiry service of the Kirghiz Institute of Scientific and Technical Information (KirgizINTI). Here are the most likely and, what is the main thing, closest addresses of assistance: the Instrument Making Plant imeni 50-letiya SSSR and the Pilot Plant of Electronic Machine Building (the inside of its washing machines in its nature is similar to the "jackets" of the Sokuluk cookers), as well as the Frunze Special Design Bureau of the Institute of Space Research of the USSR Academy of Sciences. All of them to one extent or another are connected with the welding of stainless steel. We believe that this time the trade machine builders themselves will try to build bridges of cooperation.

But it should be noted that at the Kirghiz Institute of Scientific and Technical Information they expressed bewilderment: Why did the comrades from Sokuluk not turn here immediately for such information and also not conclude with the institute for this year a contract on thematic information service? True, a contract has been drawn up for 1986. We will hope that all this will help to remove from the agenda the question, to which today the editorial office is once again giving an answer, and it will not be necessary to invent at the Kirgiztorgmash Association its own bicycle.

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REGIONAL ISSUES

KIRGHIZ PARTY OFFICIAL ON SCIENTIFIC, TECHNICAL PROGRESS

Frunze SOVETSKAYA KIRGIZIYA in Russian 27 Dec 85 p 3

[Article by R. Sadykov, chief of the Science and Educational Institutions Department of the Kirghiz CP Central Committee, in the column "The Search. The Page of Scientific and Technical Progress": "In a Unified Complex"; first paragraph is SOVETSKAYA KIRGIZIYA introduction]

[Text] In the draft of the new version of the CPSU Program the cardinal acceleration of scientific and technical progress is named as a vital question of economic strategy. The shortest routes of such acceleration--the retooling of the entire national economy, the introduction everywhere of the latest achievements of science and technology in production and the sphere of service and daily life--were designated. "We have to," General Secretary of the CPSU Central Committee M.S. Gorbachev indicated, "achieve a decisive turn in the changeover of the national economy to the path of intensive development. We should, are obliged in a short time to achieve the most advanced scientific and technical positions and the highest level of labor productivity." The party and soviet organs and scientific research and production collectives of the republic are beginning the practical accomplishment of these tasks.

As is known, the CPSU Central Committee endorsed the initiative of the Leningrad Party Organization on the formulation of the Intensification-90 Comprehensive Program, of which the key directions of scientific and technical progress constitute the basis. The experience of the Leningraders, undoubtedly, is also of interest to us. That is why the need for the formulation of the Intensification-90 Republic Territorial-Sectorial Comprehensive Goal Program is appearing. In this connection the Council for the Promotion of the Acceleration of Scientific and Technical Progress attached to the Kirghiz CP Central Committee is also improving the supervision on its compilation and implementation. Similar problems also face the councils attached to the oblast, city, and rayon party committees. The republic State Planning Committee should carry out the formulation of specific comprehensive programs with the active participation of the Academy of Sciences, higher educational institutions, sectorial and planning institutes, design bureaus, and computer centers.

For industrial enterprises of the republic, particularly machine building enterprises, the plans of retooling for the next five-year plan can serve as

the basis. When selecting materials one should direct particular attention to the fact that the introduction of an intensive, unmanned, resource-saving technology, and not the simple improvement of it, as is frequently encountered, would be envisaged. Here the experience of the work of the Frunze City Party Organization on the Tool Program and the Program of Flexible Machine Systems will be good help.

As to the Academy of Sciences and the State Planning Committee of the republic, they have to review thoroughly and critically the problems of the research, which is being performed and is outlined in the plans, from the standpoint of its conformity to present requirements and to concentrate the efforts of scientists on the solution of the most urgent complex scientific and technical problems with the extensive use of computers. It is necessary to shift resolutely from isolated improvements to the extensive implementation of advanced innovations of a comprehensive nature and to the search for universal solutions, which ensure the introduction of innovations not at individual enterprises, but in entire sectors and groups of sectors. Given such an organization of research, as the experience of the Leningraders shows, the results prove to be much more effective.

Starting already next year the scientific collectives and collectives of higher educational institutions of the republic should set to work on the elaboration of important sectorial, intersectorial, and national economic problems. The task today is, by relying on the possibilities of goal program planning, to make the management of academic science, science of the higher educational institution, and sectorial science a unified complex, which encompasses theoretical and applied research and experimental design development, and to link them more closely with related scientific institutions and enterprises of the country. In light of the tasks, which were posed by the April and October (1985) CPSU Central Committee Plenums, the scientific research support of the agroindustrial complex needs radical improvement. For the quickest introduction of the achievements of science and technology in this sphere it is necessary to increase the demandingness on the activity of agricultural sectorial institutes and to strengthen their contacts with production.

It is necessary to use more extensively the possibilities and various forms of scientific production associations. Thus, the lack to date of a unified coordinating organ and the proper supervision of the activity of sectorial agricultural scientific institutions of the republic is moderating the pace of the introduction of innovations and is leading to the dispersal of assets and forces, work on many themes, and the duplication of research. Positive experience in the establishment of scientific production associations, to which experimental and seed-growing stations, state pedigreed stock farms, and support centers belong, exists in the republic. In the future their network should be expanded, the contact between academic and sectorial institutes, the chairs of higher educational institutions, and enterprises should be strengthened, and educational scientific associations of the "faculty--scientific institution of the Kirghiz SSR Academy of Sciences" type should be established.

I would especially like to speak about the "plant sector" of science. Its direct contact with institutes and higher educational institutions of the republic will make it possible to solve successfully many problems of the improvement of production, to carry out the pilot checking of proposed developments, and to introduce them more rapidly. The equipment of scientific institutions, higher educational institutions, scientific production associations, and enterprises with computer hardware for the automation of research and design operations, the management of the control of production, the quality of the output being produced, and so on is one of the problems nhich must not be delayed.

The establishment of an interdepartmental institute for the improvement of the skills of management personnel and specialists of the national economy attached to the Kirghiz SSR Ministry of Higher and Secondary Specialized Education, the graduates of which would be able to independently introduce new methods and teach others at their own enterprises and institutions, should be expedited for the improvement of the training of personnel. While the higher school of the republic must include more boldly in the curricula the use of computers and the study of microprocessor equipment and computer-aided design systems. Equipment and computers, the latest results of scientific research, and the fundamentals of law, economics, and the organization of production should also enrich the arsenal of the educational and training process at higher educational institutions. Students should be enlisted more extensively in research work.

Planning organs, apparently, should take upon themselves the organization of the work on the program of intensification with the extensive enlistment of scientific and planning institutions, higher educational institutions, and sectorial design bureaus. Moreover, it is necessary to schedule by years of the five-year plan the introduction and assimilation of all innovations, as well as the rate of growth of the volumes and productivity of labor and the increase of product quality and production efficiency.

The acceleration of scientific and technical progress in the republic requires of scientists and production workers interest, the ability to see the future of the development of the sector and the entire national economy, and the mobilization of the entire scientific potential. The implementation of comprehensive programs will become for each labor collective a genuine school of advanced know-how and will make it possible to achieve the outlined levels in the intensification of the economy.

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REGIONAL ISSUES

MANAGEMENT OF TERNOPOL OBLAST SCIENTIFIC, TECHNICAL PROGRAMS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 10, Oct 85 pp 26-29

[Article by candidate of economic sciences V. Vykhrushch, deputy chairman of the Ternopol Oblast Soviet Executive Committee and chairman of the Ternopol Oblast Planning Commission: "On the Question of the Regional Management of Scientific and Technical Programs"]

[Text] At all the stages of the improvement of mature socialism scientific and technical progress will hold a prominent place in economic and social development. In the decree of the CPSU Central Committee, which was adopted in accordance with the results of the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, it is indicated that the changeover of the economy to the path of intensification and the large-scale use of the achievements of scientific and technical progress should become a national, partywide matter and the core of organizing, political, and economic work at all levels.

Sectorial organs of management cannot take fully into account all the socioeconomic consequences of scientific and technical progress for one region or another and effectively influence them. That is why the role of territorial organs is increasing. The councils for the promotion of scientific and technical progress attached to the oblast party committee and city and rayon party committees are an important organizational form of the influence of local organs on the acceleration of scientific and technical progress. They analyze the state and prospects of the development of the basic sectors of the national economy, study the key problems of the increase of production efficiency, and take care of the distribution and training of personnel and the generalization and dissemination of advanced know-how. The local soviets of people's deputies are taking an active part in the territorial management of scientific and technical progress. The state of the fulfillment of state, departmental, and regional plans of the development and introduction of new equipment, the provision of assistance to enterprises, and the strengthening of the creative contacts of science with production are within their competence.

In our oblast the problems of uniting the sectorial and territorial management of scientific and technical progress are being solved in several directions. In particular, a comprehensive plan of the development of scientific research

and the promotion of scientific and technical progress has been drafted and is being implemented jointly with the scientific coordinating council of the Western Scientific Center of the Ukrainian SSR Academy of Sciences. Moreover, comprehensive goal programs--"Scientific and Technical Progress," "Labor," "The Agroindustrial Complex," "Sugar," "Goods," "Services," "Construction Materials," and "Fertility"--and the Food Program for the Period to 1990 are in effect in the oblast. The experience of formulating the programs convinces us that by means of them it is possible to specify the means of achieving the posed goals and to determine what needs to be done, who needs to do it and when, the workers of territorial organs of management are being enriched by the skills of the goal program method of planning.

The long-range comprehensive program "Scientific and Technical Progress" is the basis for wrapping up the long-term problems of the development of scientific and technical progress. Within it a comprehensive forecast of the development of the national economy of the oblast and its most important units for the future was formulated. This program is the leading one, for the acceleration of scientific and technical progress is the foundation, on which the economic and social development of the region, the intensification of production, and the increase of the efficiency and quality of the work of labor collectives are based. The problems, which concern practically all the sectors of the national economy, are included in it, the complete cycle of operations from scientific research to its practical implementation is envisaged. The fulfillment of the program assignments is being constantly monitored by the oblast soviet executive committee, the progress of their implementation is examined at the meetings of the coordinating council for the promotion of scientific and technical progress attached to the oblast committee of the Communist Party of the Ukraine.

What does the system of the territorial management of scientific and technical progress provide? The initiative of labor collectives in the introduction of the achievements of science and technology and advanced know-how increases, additional reserves are sought. Since the beginning of the five-year plan nearly 22,000 scientific and technical measures have been introduced in the national economy of the oblast, as a result of which it is envisaged to obtain an economic impact of 80 million rubles. In all 155 mechanized flow and automatic lines were put into operation, 232 shops and sections were completely mechanized and automated, 649 advanced technological processes were introduced, the series production of more than 2,000 new types of industrial products was assimilated and begun, of them 73 for the first time in the country. More than 25,000 workers were changed over from manual to automated labor. The fact that during the years of the 11th Five-Year Plan the growth rate of industrial production of the oblast exceeds by nearly twofold the average republic growth rate, is evidence of the systematic influence of scientific and technical progress on the level of economic development.

The significant increase of labor productivity is the main goal of the introduction in production of the achievements of science and technology and advanced know-how. In 4 years of the five-year plan it increased by 21.2 percent, of it nearly 60 percent is due to the introduction of scientific and technical measures. This also affected the decrease of the product cost--23.5 million rubles were saved. The updating of workplaces in all the sectors

of the national economy of the oblast is reliably serving the acceleration of technical progress. The work on the certification of workplaces, which was begun last year, is being completed this year.

The introduction of resource-saving low-waste and waste-free technologies is a no less important question. Fuel, energy, and material resources of all types worth 9.7 million rubles, including 91,000 tons of standard fuel, 519,000 gigacalories of thermal energy, 132 million kilowatt-hours of electric power, 18,000 tons of cement, 22,000 cubic meters of lumber, and 20,000 tons of rolled ferrous metal products, have been saved in the oblast since the beginning of the five-year plan. The assignments on saving for the concluding year of the five-year plan are even more intense. The workers of the oblast have bound themselves this year to work 2 days on the saved resources. This will make it possible to produce products worth 10.6 million rubles and to perform construction and installation work worth more than 890,000 rubles.

The analysis of the efficiency of the management of scientific and technical progress shows at the same time that the existing possibilities are still not being fully utilized. Two-thirds of the capital investments have been channeled into the purchase of new equipment, and not for the replacement of inefficient operating equipment, as a result of which more than 30 percent of the machines and equipment at enterprises of the oblast are obsolete. The shift coefficient of machines and equipment is low. The machine tools and devices, which are being used at enterprises of local industry and the construction materials industry, in which the level of manual labor is the highest, are especially obsolete and worn out.

The soviet executive committees and their agroindustrial associations are still poorly influencing the use of capital investments in the agroindustrial sector of the economy. Given an increase of the fixed production capital in the sector by 1.7-fold, the increase of the gross output of agriculture comes to only 2.3 percent. Here the indebtedness on long-term loans of the state bank has increased in the past 4 years by 153.7 percent.

The comprehensive system of the increase of the national economic impact from the output and use of products, which has been introduced at enterprises of the region, is having a significant influence on the management of scientific and technical progress. The advanced know-how of enterprises of the country in the increase of efficiency and product quality is reflected in the system which was developed by the Vatra Production Association.

The large-scale economic experiment, which is being conducted at 55 enterprises of the food industry and at the Vatra and Ternopolskiy kombaynovyy zavod imeni XXV syezda KPSS Production Associations, promises much. The work under the new conditions, to which the results of the first half of this year attest, at the enterprises, which have been changed over to the economic experiment, is more efficient. The output of industrial products for the Vatra Production Association as against the corresponding period of last year increased by 8.4 percent. The plan on the profit was fulfilled here by 114.6 percent. All the enterprises, which are working under the conditions of the experiment, have fulfilled the plan of the sale of products with allowance made for the obligations on deliveries.

In January of this year a seminar on questions of the formulation of scientific and technical programs for the 12th Five-Year Plan was held in the oblast committee of the Communist Party of the Ukraine. The comprehensive regional programs "Scientific and Technical Progress," "Labor," "The Agroindustrial Complex," "The Development of Consumer Goods Production and Consumer Services," "Transportation," and "The Material Intensiveness," it was emphasized at the seminar, should become the basis of the system of the management of scientific and technical progress. The oblast scientific and technical programs "The Education and Training of Personnel," "Construction Materials," "The Material, Technical, and Repair Base of Construction and Repair Organizations," "Trade and Public Dining," "The Efficient Use of Free Time," "The Development of Subsidiary Industries of Kolkhozes and Sovkhozes," and "The Increase of the Production of Nonalcoholic Beverages and Juices" are also being prepared.

Each of these programs has its own specific goal and its own ways and means of its achievement. However, all of them are oriented toward the solution of problems which are especially urgent for the oblast. These are the increase of labor productivity and the improvement of product quality, the retooling of all the sectors of the economy, the efficient use of manpower, fuel, energy, and material resources, and environmental protection. The comprehensive goal program "Scientific and Technical Progress" for the 12th Five-Year Plan and the period to 2000 will specify the economic and technical solutions which will ensure the highest rate of development of the economy of the oblast within the framework of the unified national economic complex of the republic. The main assignment of the program is the achievement of the basic increase of labor productivity owing to the increase of the technical level of production. In the future period a significant increase of labor productivity will be obtained by means of this factor. The implementation of measures on the mechanization and automation of production will make it possible to convert many thousands of workers from manual to mechanized and automated labor.

The task has been posed to increase during the 12th Five-Year Plan in the country the proportion of new equipment to 50 percent, to expand the introduction at industrial enterprises of measures on the mechanization and automation of production processes, and to increase the machine shift coefficient.

The main goal of the program is to actively introduce resource-saving and low-waste technologies and on the basis of measures on scientific and technical progress to save a significant amount of fuel, electric power, thermal energy, and other resources.

A significant increase of production in agriculture is envisaged by means of the introduction of the achievements of science and technology and new know-hows.

It is no less important to evaluate realistically the state of affairs in each sector and at each enterprise. In the determination and evaluation of the technical level of production it is necessary to proceed from the certification and rationalization of workplaces. It is necessary to clarify the specific goals, to outline a set of measures, to specify the amounts of

resources and to submit them for approval to superior organizations, to deliver the assignments to the specific performers, and to develop an efficient system of the monitoring of the progress of the implementation of programs.

At each enterprise it is necessary to specify clearly the technical and economic character of the planned object, the essence of the problem, which technological processes it is necessary to introduce during the next five-year plan, what it is necessary to retool and renovate, what new types of products it is necessary to assimilate in order to obtain the maximum economic impact and high end results.

It should be emphasized that programs can have a positive influence on the acceleration of scientific and technical progress only if they are formulated with a significant lead of the drafting of the five-year plan, while their tasks are a component of the national economic plan.

Each program has a pronounced goal, tasks, basic indicators, a set of measures on the achievement of the posed goals, deadlines and specific performers, resource supply, and management of the program.

Being preplanning documents, comprehensive programs also serve as the information base of the achieved level of the structure of production and its efficiency and help to identify the existing disproportions and bottlenecks and the most effective directions of their elimination.

For the more active influence of the local soviets on the fulfillment of the assignments on the introduction of the achievements of science and technology and advanced know-how it would be advisable, in our opinion, to introduce in the plans of economic and social development indicators of the introduction of science and technology and advanced methods and forms of the organization of production. Indicators, which characterize the work on the modernization of production and the introduction of advanced technological processes, should be introduced in the monthly statistical returns, while in addition to this the indicators of the obtained impact should be introduced in the quarterly reports.

At economic higher educational institutions it is advisable to expand the teaching of engineering and technological subjects and the use of mathematical methods and electronic computer technology in management work and to improve the quality of the training of specialists.

The determination of the economic impact from the introduction of measures on equipment, advanced know-how, and new technology requires the rapid development and approval of a unified method. It is necessary to evaluate in the plans the efficiency from the introduction of the tasks of science and technology.

It would be useful to hold annually public reviews of the achievements of scientific and technical progress and to determine the winners; in evaluating the work of managers and labor collectives to regard as one of the main

criteria the performed work on the introduction of the achievements of science and technology.

As General Secretary of the CPSU Central Committee M.S. Gorbachev noted at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, the retooling of enterprises is one of the most important assignments of the five-year plan and party economic policy. Today the improvement of all our work--the increase of labor productivity, the increase of product quality, and the efficient use of assets and material, energy, and manpower resources--depends on the prompt, efficient, and practical introduction in production of the most up-to-date equipment and advanced technologies.

A large field of activity for regional organs of management is being opened in the practical solution of these problems.

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REGIONAL ISSUES

PROBLEMS OF COMPOSITE MATERIALS PRODUCTION IN TURKMEN SSR

Ashkhabad TURKMENSKAYA ISKRA in Russian 9 Jan 86 p 2

[Article by TURKMENSKAYA ISKRA correspondent N. Sosnina under the rubric "Returning to What Was Published": "And Again Inertia"; first paragraph is TURKMENSKAYA ISKRA introduction]

[Text] "Stone Fiber and the Burden of Inertia"--that is how the articles, which were published in TURKMENSKAYA ISKRA on 7 and 10 September 1985, were titled. In them it was a question of the problems of assimilating effective items based on mineral fibers. The lack of understanding of the importance of this direction of scientific and technical progress, interdepartmental discord, the inertia of thinking, and the inefficiency of a number of managers involved in the matter became the reason that the republic, which has abundant reserves of polymineral raw materials--dune sand and basalt porphyrite--for the present is not using its possibilities in the organization of economical, profitable works of composite materials.

After the publication of the articles the turn toward what is new and the changes with respect to stone and sand fibers became obvious. The steps on the specification of the all-union scientific and technical program for the 12th Five-Year Plan and the period to 2000 on the development of highly efficient composite materials, items based on them, and the technology of their production gave hope.

At the end of September a representative technical conference with the participation of scientists of the Ukrainian SSR and Turkmen SSR Academies of Sciences, managers and leading specialists of the Plastmassy Scientific Production Association of the USSR Ministry of the Chemical Industry, the USSR State Committee for Science and Technology, the Turkmen SSR State Planning Committee and State Committee for Construction Affairs, and republic ministries and departments was held in this connection in the Turkmen SSR State Planning Committee.

The active and businesslike cooperation with scientists and production workers of the fraternal Ukraine, who have successfully assimilated the production of many composite materials for the needs of capital construction, is of great importance. In October a seminar devoted to the prospects of the development and use of basalt fiber was held in Kiev. While important decisions were made

at the scientific research laboratory of the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences.

The idea of establishing a temporary collective made up of representatives of interested organizations of our republic for the solution of the problems connected with the introduction of mineral fibers and items made from them was supported. The scientists of the Ukraine are ready to give scientific methods assistance to such a collective.

It was deemed advisable to formulate in light of the all-union program an interrepublic program which would unite and coordinate the efforts of the two republics--the Ukraine and Turkmenistan--on the production of composite materials. The Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences agreed to accept specialists of the Turkmen SSR for probationary work and training.

Turkmen specialists came to an agreement with the Ukrainian State Scientific Research and Planning Institute of Rural and Agricultural Construction on cooperation in the designing and building of poultry plants and livestock farms from components which are fundamentally new for our region. The Turkmen SSR Ministry of Local Industry concluded the corresponding contract with the scientific research laboratory of the Institute of Problems of Material Science.

In short, in complete conformity with the provision of the draft of the new version of the CPSU Program on the gradual intensification of the division of labor between republics, the equalization of the conditions of management, and the development of the interrepublic exchange of staffs of workers and specialists the Ukraine is giving purposeful assistance to our republic. It was a matter of steps in response. And they were taken.

An interdepartmental commission under the supervision of Deputy Chairman of the Turkmen SSR State Committee for Construction Affairs B. Annaniyazov, which was made responsible for the formation of a temporary collective and the drafting of a statute on its organization and activity, was established. The deadlines and specific performers were set.

A little earlier the progress of the fulfillment by the Turkmen SSR Ministry of Land Reclamation and Water Resources of the decree of the Turkmen SSR Council of Ministers on the increase of the production of composite materials and the expansion of their use in the sectors of the Turkmen SSR national economy was examined at a conference in the presence of the deputy chairman of the Turkmen SSR Council of Ministers. The task of carrying out prior to the organization of the temporary collective the scientific and technical supervision of the establishment of the pilot industrial production of basalt fiber was imposed on the Solntse Scientific Production Association and personally on V.S. Lapin, the chief engineer of the scientific production association.

President of the Turkmen SSR Academy of Sciences A. Babayev sent to President of the Ukrainian SSR Academy of Sciences Academician B.Ye. Paton a letter with the request to consider and, if possible, to decide affirmatively the question

of the carrying out by the Institute of Problems of Material Science of the scientific methods supervision of the activity of the temporary collective in the Turkmen SSR.

Judging from the documents, last year the first temporary collective in Turkmenistan should have already begun the organization of the pilot industrial production of basalt fiber, and then the development of the technology of obtaining mineral fibers from dune sand. It was assumed at first that the thermos shop, which is nearly not being used now at the Ashkhabad Glass Combine, would become the base. It was necessary to set up here only a small plant.

But Turkmen SSR Minister of the Construction Materials Industry V.I. Gladkiy objected. Arguing, apparently, according to the principle--even though it is inoperative, it is mine--Viktor Ivanovich proposed in essence not a new version--wait until the shop of basalt fiber is built at the Bezmein Combine of Construction Materials imeni 50-letiya TSSR, and then, he says, begin the tests.

In the articles "Stone Fiber and the Burden of Inertia" the slow pace of the construction and renovation of enterprises of the sector has already been spoken about. The construction of the shop at the Bezmein Combine has not yet been started, while no one can assert with confidence when it will be put into operation. To accept the suggestion of V.I. Gladkiy in practice signified one thing--to put off the establishment of the temporary collective to the very uncertain future.

It is clear that they do not agree with the minister. But the next decision could have plunged anyone into dismay. They designated as the pilot industrial base the basalt plant in Chardzhou, which, alas, has been under construction by the Ministry of Land Reclamation and Water Resources for five standard periods.

To this day the problems of the financing, designing, and construction of a gas main to the enterprise have not been solved. The route for it has not been selected, a topographic geodetic survey has not been made. It is not clear on what raw materials the plant will operate, for at the Krasnovodsk deposit of basalt porphyrite these is no open pit. The nonstandard equipment has not been delivered in the full amount. Nevertheless the nonexisting plant is being declared, with the consent of Turkmen SSR Deputy Minister of Land Reclamation and Water Resources V.P. Dolgov, the experimental base of the temporary collective. The question of its formation was finally driven into a corner.

They also do not mention, incidentally, the collective. They are talking only of giving the Turkmenvodorgtekhstroy Trust of the Turkmen SSR Ministry of Land Reclamation and Water Resources additional staff. But this is not a temporary collective.

On 18 December Kiev specialists, to whom invitations were sent, came to Ashkhabad for the conclusion of contracts for scientific development in the area of composite materials and the investigation of the construction industry

of the Turkmen SSR ministries of land reclamation and water resources and rural construction. About what did the executives of the ministries and departments of our republic talk with them, if the noted enthusiasm and system in fact had turned into their opposite?!

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REGIONAL ISSUES

DEVELOPMENT OF FAR EAST'S SCIENTIFIC POTENTIAL

Moscow EKONOMICHESKAYA GAZETA in Russian No 51, Dec 85 p 9

[Article by S. Olenin, chief of a department of the Maritime Kray Committee of the CPSU (Vladivostok): "The Scientific Potential of the Maritime Region"; capitalized passages published in boldface]

[Text] The questions of the further development of scientific research and its quickest materialization in the national economy found the most serious reflection in the draft of the new version of the CPSU Program. In it, in particular, it is especially emphasized that THE ORGANIZATIONAL AND ECONOMIC FORMS OF THE INTEGRATION OF SCIENCE AND PRODUCTION SHOULD BE CONSTANTLY IMPROVED.

Maritime Kray has a significant scientific potential. Vladivostok, where nearly half of the scientific potential of the Far East is concentrated, including 10 institutes of the Far Eastern Scientific Center of the USSR Academy of Sciences, 12 higher educational institutions, and more than 20 scientific institutions of the sectorial type, in recent years has become a truly regional scientific center. Hundreds of highly skilled specialists are conducting creative research in plant design bureaus and laboratories.

In the decree of the CPSU Central Committee "On the Activity of the Far Eastern Scientific Center of the USSR Academy of Sciences on the Development of Basic and Applied Research, the Increase of Its Efficiency, and the Introduction of Scientific Achievements in the National Economy," which was adopted in early 1980, the fundamental principles of the organization of scientific work and the use of its results, which have become, in reality, the basis of the regional scientific and technical policy, were specified.

In light of the requirements of this decree measures, which are aimed at turning the scientific institutions of the kray into collectives of a high research level, which have an adequate material base and skilled personnel, have been elaborated and are being implemented. Special attention is directed to the strengthening of the contact of science with production.

The assurance of THE RAPID DEVELOPMENT OF THE PRODUCTIVE FORCES OF THE FAR EAST, THE COMPREHENSIVE SOLUTION OF PRODUCTION PROBLEMS, AND THE DEVELOPMENT OF THE ENTIRE SOCIAL INFRASTRUCTURE, which is clearly spoken about in the

precongress documents, in many ways depends on the efficiency of the work of the scientific collectives of the kray. Today more and more attention is being devoted to the elaboration of the scientific principles of the comprehensive development of the region, on the basis of which the Far East Unified National Economic Program is being formulated.

The contacts of the Far Eastern Scientific Center with industrial enterprises and transportation organizations are being expanded. During the years of the current five-year plan 1,040 scientific developments have been turned over to the sectors of the national economy. Of them more than 200 have been introduced, the economic impact came to 118 million rubles. Thus, the advanced method of the processing of mineral raw materials, which was proposed by the Institute of Chemistry and was introduced by the Primorskiy Mining and Ore Dressing Combine, made it possible to increase the extraction of valuable components from complex ores.

Scientists of the Biology and Soil Science Institute prepared recommendations for the agricultural enterprises of the kray, which are aimed at the improvement of seed potatoes and the efficient preparation of soybean seeds for sowing. The cultivation, for example, in accordance with the new technology of potatoes at the Urozhaynyy Sovkhoz helped to increase the yield by nearly twofold--to 160-170 quintals per hectare.

However, there are still many unsolved problems in the strengthening of the contact of science with production. An obvious shortage of basic research, which could be made the basis for the development of fundamentally new technologies--resource-saving technologies and technologies involving few people--is being felt. Here the collectives of scientists of the Maritime Region are lagging behind the requirements of the times and the demands of production. The preparation of comprehensive goal programs on the development of the fuel and power base and the use of the natural resources, transportation, and manpower resources of the Maritime Region, which should become a component of the plan of the socioeconomic development of the kray during the 12th Five-Year Plan, is necessary.

A large program of theoretically and practically urgent research on the methods of prospecting for nonferrous metals and on the complete processing of mineral raw materials has been outlined in the new five-year plan.

The combining of science with production is a complex problem. Ministries and departments, specialists of academic and sectorial scientific research institutes, production collectives, and institutions of the Far East should take part in this process. It is necessary to coordinate their actions skillfully. The interdepartmental coordinating council, which was established under the Presidium of the Far Eastern Scientific Center, has gained some experience in such work--it has to its credit 577 contracts on the creative cooperation of interested collectives. A program of applied research in the amount of more than 80 million rubles has to be implemented during the 12th Five-Year Plan.

The coordination of research, which the council is carrying out within the framework of four interdepartmental special-purpose scientific production

associations, has confirmed its effectiveness. Among them are the studies of powder metallurgy and organic mineral fertilizers, which are important for the kray.

During the next five-year plan the pilot production base has to be strengthened significantly. We see a way out in the establishment jointly with enterprises of experimental shops and sections, the use on a proportionate basis of the base of higher educational institutions and sectorial scientific research institutes, and the more efficient use of expensive equipment.

The increase of the level of scientific developments is an urgent task. Thus, last year more than 30 percent of the developments of scientists of the Far Eastern Scientific Center, which were examined in the USSR State Committee for Inventions and Discoveries, were not recognized as inventions--mainly due to inadequate efficiency. Of the 215 scientific research jobs, which were turned over to the national economy, only 9 were completed at the level of inventions.

The improvement of scientific organizational work is aimed at the elimination of these and other shortcomings.

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CONFERENCES AND EXPOSITIONS

GENERAL ASSEMBLY SESSION OF LITHUANIAN ACADEMY OF SCIENCES

Vilnius SOVETSKAYA LITVA in Russian 8 Jan 86 p 1

[Unattributed article: "Science Is the Catalyst of Progress"]

[Text] Vilnius, 7 January (ELTA)--The session of the General Assembly of the Lithuanian SSR Academy of Sciences, at which the decisions of the October (1985) CPSU Central Committee Plenum were discussed, was held today.

Comrades P. Grishkyavichus, V. Mikuchyauskas, V. Sakalauskas, L. Shepetis, Deputy Chairman of the Lithuanian SSR Council of Ministers and Chairman of the Republic State Planning Committee B. Zaykauskas, Deputy Chairman of the Lithuanian SSR Council of Ministers A. Chesnavichus, Chief of the Science and Educational Institutions Department of the Lithuanian CP Central Committee S. Imbrasas, and other responsible party and soviet officials attended the session.

President of the Lithuanian SSR Academy of Sciences Academician Yu. Pozhela gave the report "The Draft of the Basic Directions of USSR Economic and Social Development for 1986-1990 and the Period to 2000 and the Tasks of the Lithuanian SSR Academy of Sciences."

In the published document of enormous importance, the speaker emphasized, it is indicated that the main goal of the economic strategy is to increase continuously the rate of development of the national economy. For the most part this should be achieved by means of scientific and technical progress and the development and use of new production technologies. Here science, and particularly basic science, which is being developed at the academies of sciences and higher educational institutions of the country, is called upon to play a large role. The documents for the 27th CPSU Congress, in which the basic directions of the increase of the efficiency of the activity of scientific organizations are outlined, contain precisely the appeal to develop basic science, to increase the quality and intensity of its research, to strengthen the contacts of science with production, and to develop such organizational forms of the integration of science, technology, and production, which would make it possible to achieve the large-scale use of scientific ideas in practice.

The Lithuanian SSR Academy of Sciences during the 11th Five-Year Plan made significant gains. The number of doctors of sciences increased by nearly 1.5-fold, more than half of the scientists defended candidate dissertations. Highly skilled personnel are working at the institutes of the Physical, Technical, and Mathematical Sciences Department and at the Institute of Philosophy, Sociology, and Law. Good results were achieved in the field of the exact sciences and the humanities. However, the experimental research base of the academy is still being developed poorly and too slowly--it lags behind the present requirements. At the institutes of the natural sciences during the past five-year plan it was not possible to conduct important basic biological and biotechnological research. The work in the area of mechanics and machine building has not yet been started. For the increase of the level of research and its effectiveness it is necessary to change resolutely the style of work.

The republic Academy of Sciences, as was noted at the session, is capable of accomplishing the tasks posed by the party and of elaborating the themes of work of the most important directions. In order to speed up this research, the structure of the network of institute laboratories will have to be revised, such scientific collectives, which could quickly obtain effective results of research, which makes it possible to change production significantly, have to be united.

The Academy of Sciences maintains contacts with higher educational institutions, at which the basic forces of basic science are concentrated. Joint work is being performed, but the reserves of such cooperation are still great. In the future this cooperation should be stimulated even more. Having united efforts, specialists of the highest skills could contribute, for example, to the rapid realization of the process of computerization and to the introduction of computer technology in the system of education.

During the 11th Five-Year Plan the integration of science and production was intensified. At the academy the amount of cost accounting operations increased by nearly 3 million rubles, the obtained economic impact exceeds by more than twofold this indicator of the 10th Five-Year Plan. The successful work stemmed from the fact that at one time scientific production associations of various forms, as well as interdepartmental laboratories were established and contracts with individual ministries, scientific research institutes, and the city of Shyaulyay were concluded. The scientific production associations, which encompass many production and scientific institutions, justified themselves to the greatest extent. These are the Elektronika, Lazery, Vibrotekhnika, and Galvanotekhnika Scientific Production Associations.

The tasks, which were posed in the program of the economic and social development of the country, obliged the collective of the Academy of Sciences to take an active position in the matter of introducing the achievements of basic science in production. Measures and means of accomplishing these tasks were outlined in the decree adopted at the session.

Lithuanian SSR Minister of Higher and Secondary Specialized Education G. Zabulis; Academician E. Vilkas, director of the Institute of Economics of the Lithuanian SSR Academy of Sciences; A. Chuplinskas, general director of the

Sigma Production Association; Yu. Kulis, director of the Institute of Biochemistry of the Lithuanian SSR Academy of Sciences; Vice President of the Lithuanian SSR Academy of Sciences Academician V. Statulyavichyus; Academician of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin B. Poshkus, director of the Institute of Agricultural Economics; V. Lazutka, director of the Institute of Philosophy, Sociology, and Law of the Lithuanian SSR Academy of Sciences; and V. Kontrimavichyus, academician-secretary of the Chemical, Technological, and Biological Sciences Department, spoke during the discussion.

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CONFERENCES AND EXPOSITIONS

GENERAL ASSEMBLY OF GEORGIAN ACADEMY OF SCIENCES

Tbilisi ZARYA VOSTOKA in Russian 19 Dec 85 p 3

[Article (GRUZINFORM): "Clear Guidelines"; first paragraph is ZARYA VOSTOKA introduction]

[Text] The General Assembly of the Georgian SSR Academy of Sciences has been held. It took place in a creative atmosphere, in an atmosphere of efficiency and an aim at the further increase of the scientific and technical potential of the republic and the launching of scientific research, which is aimed at major changes in the intensification of the economy.

President of the Georgian SSR Academy of Sciences Academician Ye. Kharadze delivered the report.

Chief of the Science and Educational Institutions Department of the Georgian CP Central Committee A. Sakvarelidze spoke at the assembly.

In the report and statements it was emphasized that the draft of the new version of the CPSU Program is a most important party document, in which means of accomplishing a twofold task--the improvement of socialism, gradual progress toward communism and the assurance of peace, the security of peoples, and the prevention of nuclear war--are specified. In the draft of the Basic Directions the economic strategy of the party is revealed, the provisions of the draft of the new version of the Program, which are translated into the language of specific plan assignments, are materialized.

In the accomplishment of the tasks, which are outlined by these documents of enormous political importance, a large role belongs to Soviet science. The leading development of the basic efforts of long-range research and their quickest introduction in practice are envisaged. Science is called upon to ensure the rapid socioeconomic development of the country and its reliable defensive capability.

It should be clear not only to scientists, but to each worker that first of all the more active intensification of the scientific and technical revolution is necessary for the implementation of the present policy of the party, which is based on the assurance of the decisive role of economics in the development of our society. Only through its diverse, comprehensive achievements is it

possible to increase sharply the pace of the accomplishment of the new technical renovation of the national economy, to change it over to the intensive path of development, and to bring the economy of the country up to the highest level of organization and efficiency.

Here, the speakers indicated, it is necessary to accomplish these tasks, which are becoming complicated, in a new way, with a great sense of responsibility, and to place, as the party requires today, at the center of attention the questions of the intensification of production, the acceleration of scientific and technical policy, the tightening up of the policy of economy, and the improvement of the style of work.

Among the many problems, which face Georgian science during the 12th and subsequent five-year plans, the assembly participants singled out such priority ones as the improvement of the mechanism of the introduction of new scientific developments, the development of efficient technologies, the strengthening of the experimental design base of the Georgian SSR Academy of Sciences, and the extensive introduction of computer hardware in research and design operations. It is necessary to concentrate the efforts of scientific collectives on the further development of fundamental, basic, and applied research, which is connected with the thorough and comprehensive study of the natural resources of Georgia, for their efficient use in the national economy of the republic and the country.

The fields of science, which connected with the improvement of machine building, instrument making, electrical engineering, and electronics and with the rapid development of computer hardware, will be developed intensively. The research in the area of cybernetics, systems and methods of control, the use of robotics and manipulators in the national economy, and so on should also be developed in the republic at a priority pace.

Social scientists are called upon to conduct research, the results of which are needed for making the optimum decisions in the economy and in the area of the sociopolitical and cultural development of the country. Their task is to report in an intelligible manner and at a high scientific level to the broad masses of workers the program provisions of the economic strategy of the party and the content of the precongress documents. It is necessary to aim the efforts of political economists, philosophers, psychologists, and representatives of the other social sciences at the acceleration of scientific and technical progress, the improvement of the economic mechanism and the system of the management of the economy, and the increase of the level of education and skills of the workers.

In the drafts it is indicated that the complex nature of current problems requires the intensification of the integration of the social, natural, and technical sciences. This task envisages, first of all, the development of scientific work in the fields which are arising at the meeting point of the natural and technical sciences. In the republic much has been done in this direction. Our scientists have to intensify research in the field of ergonomics, technical aesthetics, engineering psychology, economic cybernetics, structural and applied linguistics, mathematical logic, and so on.

The acceleration of scientific and technical progress, the reform of the economic mechanism, and the improvement of planning and management--these measures are of a complex and long-term nature, it was indicated at the assembly. And they are increasing the importance of such concepts as discipline and responsibility, thrift and conscientiousness..., without which our present and future success is impossible.

The General Assembly of the Georgian SSR Academy of Sciences unanimously endorsed the drafts of the new version of the party Program and the Basic Directions and the party policy of the acceleration of the socioeconomic development of the country and the active struggle on the international arena for the cause of peace and progress.

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AWARDS AND PRIZES

NOMINATIONS FOR GEORGIAN STATE PRIZE IN SCIENCE, TECHNOLOGY

Tbilisi ZARYA VOSTOKA in Russian 24 Dec 85 p 3

[Unattributed article: "From the Committee for Georgian SSR State Prizes in Science and Technology Attached to the Georgian SSR Council of Ministers"]

[Text] The Committee for Georgian SSR State Prizes in Science and Technology attached to the Georgian SSR Council of Ministers reports that the following works have been allowed to take part in the competition for the 1986 Georgian SSR State Prize:

I. In Science

1. R.G. Abdushelishvili, A.D. Zedgenidze, I.Sh. Zedgenidze, Ts.S. Makalatiya, L.V. Chakvetadze, Ts.V. Chinchaladze, M.Sh. Sheklashvili--the series of works: "The Scientific Principles, Development, and Introduction in Practice of Methods of the Early Detection of Leukoses and Preleukotic States, Factors of the Risk of Their Occurrence, Clinical Cytomorphological Diagnosis, Prevention, and Treatment," 1966-1984.

Submitted by the Institute of Hematology and Blood Transfusion imeni Academician G.M. Mukhadze of the Georgian SSR Ministry of Health.

2. N.S. Amaglobeli (director), T.S. Grigalashvili, V.P. Dzhordzhadze, V.D. Kekelidze, M.F. Likhachev, G.I. Nikobadze--the series of works: "The Detection and Study of the Baryon State With Latent Strangeness," 1980-1984.

Submitted by the Scientific Research Institute of High Energy Physics of Tbilisi State University.

3. B.K. Balavadze (director), V.G. Abashidze, M.A. Aleksidze, K.Z. Kartvelishvili, K.M. Kartvelishvili, P.Sh. Mindeli, G.Sh. Shengeliya--the series of works: "The Development and Implementation of Gravimetric Methods of Solving Geological Geophysical and Engineering Problems," 1975-1984.

Submitted by the Institute of Geophysics of the Georgian SSR Academy of Sciences.

4. U.A. Gabuniya (director), K.G. Kavtiashvili, D.A. Kutivadze, T.G. Lomaya, D.G. Silagadze, L.I. Sheynina, V.E. Yakobidze--the series of works: "The Role of Modern Methods in Solving the Key Problems of Theoretical and Practical Oncology and the Introduction of the Results of Research in Health Care Practice," 1964-1984.

Submitted by the Institute of Experimental Morphology imeni A.N. Natishvili of the Georgian SSR Academy of Sciences.

5. G.G. Gvelesiani (director), I.B. Baratashvili, A.A. Nadiradze, D.Sh. Tsagareyshvili--the series of works: "The Theoretical and Experimental Study of the Thermodynamic Characteristics of Crystalline Inorganic Compounds," 1965-1983.

Submitted by the Institute of Metallurgy imeni 50-letiya SSSR of the Georgian SSR Academy of Sciences.

6. L.L. Dekaprelevich (posthumously) (director), A.A. Abkhazava, M.S. Gviniashvili, O.A. Liparteliani, S.G. Tedoradze, V.T. Chkhikvadze, A.V. Yakobashvili--"The Development and Introduction of the First Georgian Simple Interlinear Corn Hybrid 'Kartuli 9 MV'," 1962-1984.

Submitted by the Georgian SSR State Committee for Agricultural Production.

7. V.V. Kashibadze--"Aerodinamicheskoye soprotivleniye gornykh vyrabotok" [The Aerodynamic Drag of Mine Workings], a monograph, Izdatelstvo "Nedra", Moscow, 1983.

Submitted by the Georgian Order of Lenin and Order of Labor Red Banner Polytechnical Institute imeni V.I. Lenin of the Georgian SSR Ministry of Higher and Secondary Specialized Education.

8. G.A. Tevzadze--"Kosmologiya Rustaveli" [The Cosmology of Rustaveli], a monograph, Izdatelstvo "Sabchota Sakartvelo", Tbilisi, 1984.

Submitted by Izdatelstvo "Sabchota Sakartvelo".

II. In Technology

1. E.Ya. Gogava, R.R. Dzhindzholiya, K.Ya. Kiladze, R.M. Khoperiya, A.M. Khukhunashvili, G.I. Tsintsadze, N.A. Charelidze--"The Development, Devising, and Introduction of the Technology of a Machine for the Production of Fine Black Tea," 1974-1985.

Submitted by the Tbilisi Main Special Design Bureau of Food Machine Building of the USSR Ministry of Machine Building for Light and Food Industry and Household Appliances.

2. Z.A. Gordeziani, Sh.U. Dzhavakhadze, A.N. Dzhdzhanidze, N.S. Kvinikhidze, Yu.S. Rekhviashvili, B.G. Sanikidze, Ts.N. Turmanidze--"The Introduction of the Tolstyy Mechanized Complex of 20 KP in the Working of a Thick, Steep Coal Seam, Which Is Liable to Rock Bursts and Spontaneous Combustion, in Horizontal

Layers With the Erection of a Flexible Cover Made of Metal Screen Under the Conditions of the Tkibuli-Shaorskiy Deposit," 1981-1984.

Submitted by Georgian Coal Production Association of the USSR Ministry of the Coal Industry.

3. G.S. Dzhomardzhidze (director), V.S. Dvali, R.A. Ivardava, G.G. Kiladze, S.B. Koshut, N.I. Mgalobishvili, L.M. Kharebava--"A Set of Operations on the Modernization of Tea Drying Machines and Air Heating Plants, the Introduction of a New System of the Heat Supply of Tea Factories, and Enviromental Protection," 1974-1985.

Submitted by the Georgian SSR State Committee for the Tea Industry and the Georgian State Institute for the Planning of Food Industry Enterprises of the All-Union Association for the Designing of Food Industry Enterprises of the USSR Ministry of the Food Industry.

4. G.D. Chelidze (director), N.G. Abuladze, T.D. Dolidze, O.Yu. Yefimov, V.F. Laptev, D.D. Tavkhelidze, A.G. Khoperiya--"The Development and Introduction of a Readjustable Automated Line of the Machining of Cylindrical Parts," 1979-1983.

Submitted by the Tbilisi Aircraft Plant imeni Dimitrov.

5. Z.D. Chivadze (director), A.P. Bedoshvili, D.N. Bolashvili, D.P. Giorgadze, O.A. Kiknadze, T.O. Tzkhadadze, G.I. Chirakadze--"The Study, Development, and Introduction in Series Production of the VL-11 Direct Current Main Line Electric Freight Locomotive of Multisectional Formation," 1975-1984.

Submitted by the Tbilisi Elektrovozostroitel Production Association of the USSR Ministry of the Electrical Equipment Industry.

In publishing the list of works, which have been allowed to take part in the competition for the 1986 Georgian SSR State Prize in Science and Technology, the committee appeals to the public to report its opinion both on the content of these works and on the composition of the submitted collectives of authors.

The committee asks the executives of scientific and scientific and technical societies, scientific institutions, enterprises, and higher educational institutions to organize the public discussion of the indicated works and compositions of the collectives of authors.

Please send the reports and remarks, as well as the materials of the public discussion to the committee through 20 January 1986 at the address: 380008, Tbilisi, Prospekt Rustaveli, the Presidium of the Georgian SSR Academy of Sciences, the Committee for Georgian SSR State Prizes attached to the Georgian SSR Council of Ministers. Telephone numbers: 99-93-29, 93-88-72.

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AWARDS AND PRIZES

ELECTRICAL MEASURING INSTRUMENTS VIE FOR UKSSR STATE PRIZE

Kiev PRAVDA UKRAINY in Russian 8 Sep 85 p 3

[Article by Academician of the Ukrainian SSR Academy of Sciences F. Grinevich, chief of the Department of Electrical and Magnetic Measurements of the Institute of Electrodynamics of the Ukrainian SSR Academy of Sciences, under the rubric "For the Ukrainian SSR State Prize": "The Heirs of Doctor Galvani"]

[Text] Italian anatomy scholar Galvani, while dissecting a frog, discovered electric current. The frog's foot in Galvani's experiment was actually the first control instrument which revealed the presence of an electric current. Various instruments for the measurement of current, tension, and power--ammeters, voltmeters, and wattmeters--only appeared much later. In honor of Doctor Galvani the most sensitive of them was named the galvanometer.

It is possible by means of it to detect currents of hundreds of millionths of an amp and a tension of millionths of a volt. For comparison let us point out that the current, which flows through the bulb of a flashlight, is tens of millions times greater. Until recently such instruments were used in various fields of science and technology. For protection against vibration they fastened the galvanometers on special brackets to the wall of the building, for the increase of sensitivity instead of a needle they used a "light spot," which ran along the scale with the turning of the reflector, which was attached to a mobile frame with a current. A highly sensitive, but unwieldy, nonportable, and very "slow-moving" instrument was obtained.

With the development of the scientific experiment and space, biological, and biophysical research, with the emergence of nuclear power and cryogenic engineering, and with the use of computers the need arose for the development of instruments of a new type--portable, transportable instruments, which are resistant to vibrations and the effect of interference of various origins and have a high speed and sensitivity.

The collectives of Lvov Polytechnical Institute and the Moscow Power Engineering Institute, the Lvov Mikropribor Production Association, the Zolochev Radio Plant, and the Nevinnomyssk Plant of Electrical Measuring Instruments undertook to solve the important state problem. Work was conducted for more than 10 years. As a result of the fruitful cooperation of

science and enterprises a range of domestic electrical measuring devices (digital galvanometers, voltmeters, ammeters, ohmmeters) was developed. They surpass in metrological characteristics, resolution, and sensitivity the best world models, including instruments of the leading firms of England, the United States, and Japan.

Now our country is completely supplied with high-precision high-speed digital electrical measuring equipment with the complete automation of the process of measurement and with the remote output of the results of measurement. The need for imports has disappeared. The series output and introduction of the equipment are giving the country an economic impact of tens of millions of rubles.

"The Development of the Theoretical Bases and Principles of the Construction of Measuring Devices of the Integrating Type, the Development on This Basis, and Introduction in Series Production of Digital Measuring Instruments With Increased Accuracies and Operating Characteristics" can serve as an example of the fruitful cooperation of science with production. An important state problem was solved promptly on the basis of the most advanced achievements of science and technology.

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AWARDS AND PRIZES

COMPETITION FOR UKSSR STATE PRIZES IN SCIENCE, TECHNOLOGY

Kiev PRAVDA UKRAINY in Russian 8 Jan 86 p 3

[Unattributed article: "From the Committee for Ukrainian SSR State Prizes in Science and Technology Attached to the Ukrainian SSR Council of Ministers"]

[Text] The committee announces the acceptance of works and textbooks for the 1986 Ukrainian SSR State Prizes in Science and Technology.

The Ukrainian SSR State Prizes in Science and Technology are awarded for outstanding scientific works, profound theoretical research on questions of Marxist-Leninist science and the development of the state and economy, for works on the development and introduction in the national economy of new efficient equipment, highly productive technological processes, advanced materials, and advanced production know-how, and for the development of textbooks for higher, secondary specialized, and vocational and technical educational institutions and the secondary general educational school, which have been executed at a high scientific and methods level.

The nomination of works and their authors for the Ukrainian SSR State Prizes in Science and Technology is made by Ukrainian SSR ministries and departments, the Ukrainian SSR Academy of Sciences, the Ukrainian Republic Council of Trade Unions, the Ukrainian Komsomol Central Committee, the Board of the Ukrainian SSR Society for Knowledge, the Ukrainian Republic Council of the All-Union Society of Inventors and Efficiency Experts, scientific research and planning and design institutions and higher educational institutions, the councils of scientific and technical societies, publishing houses, enterprises, institutions, and organizations of the republic.

The submitting of textbooks for Ukrainian SSR State Prizes is carried out for higher and secondary specialized educational institutions by the Collegium of the Ukrainian SSR Ministry of Higher and Secondary Specialized Education, for the secondary general educational school by the Collegium of the Ukrainian SSR Ministry of Education, and for vocational and technical schools by the Collegium of the Ukrainian SSR State Committee for Vocational and Technical Education.

The acceptance of works and textbooks for the 1986 Ukrainian SSR State Prizes in Science and Technology ends on 25 April 1986.

The works and textbooks, which have been submitted after the indicated date, will not be considered.

For information on the procedure of the nomination of works and textbooks for Ukrainian SSR State Prizes in Science and Technology, the drawing up and submitting of the appropriate documents apply to the Committee for Ukrainian SSR State Prizes in Science and Technology attached to the Ukrainian SSR Council of Ministers at the address: 252021, Kiev-21, Ulitsa Kirova, 18, Room 3, telephone numbers: 93-05-01, 91-28-02.

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BIOGRAPHICAL INFORMATION

LEONID PETROVICH STRAKHOV

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA: FIZIKA, KHIMIYA in Russian No 4, Nov 85 p 107

[Article by O.F. Vyvenko, P.P. Konorov, and F.T. Novik: "Leonid Petrovich Strakhov (On His 60th Birthday)"]

[Text] On 3 August 1985 Doctor of Physical Mathematical Sciences Leonid Petrovich Strakhov, a professor of the Physics Faculty, was 60.

More than 30 years of the life of L.P. Strakhov are inseparably connected with Leningrad University. A participant in the Great Patriotic War and a driver at the front, after demobilization from the ranks of the Soviet Army he enrolled in the Ural University. In 1952 he was transferred for the completion of his studies to the Physics Faculty of Leningrad University. Among the best graduates, L.P. Strakhov was retained at the Chair of Electrophysics (at present the Chair of Solid-State Electronics), and already in his graduation project revealed a new phenomenon in semiconductor physics--the appearance in case of the exposure of semiconductor films to light of a photoelectromotive force, the magnitude of which exceeded by several fold the forbidden zone of semiconductors. This phenomenon stimulated an extensive set of studies of the structure and the electrical and photoelectric properties of thin-film semiconductors, which led to a large number of practical applications.

Extensive erudition, a heightened sense of what is new, the capacity for scientific foresight, and boldness in the choice of a scientific direction are characteristic of Leonid Petrovich. While engaged in the study of thin-film semiconductors, L.P. Strakhov was among the first to direct attention to the important role of the surface in the formation of their electronic properties. Under his supervision work was begun at the chair on the development of new surface-sensitive methods of studying a solid. Starting in 1961 L.P. Strakhov began to develop a new scientific direction at the university--the study of the magnetic properties of low-magnetic semiconductor materials. In the laboratory managed by him original magnetostatic and resonance methods were developed and extensive research, which made it possible to develop new approaches in the interpretation of the properties of low-magnetic materials, was conducted. The series of these works was the basis for his doctoral dissertation, which was defended in 1972.

The author of more than 130 scientific works, which are devoted to the study of the problems of modern semiconductor material science, L.P. Strakhov was one of the first, who indicated the need for the organization of research on pure and structurally perfect semiconductor monocrystals, the use of which makes it possible to identify the physical properties of the material itself. A group for the growing of semiconductor monocrystals, the results of the work of which received a high rating of specialists, was set up in the chair on his initiative.

L.P. Strakhov is skillfully conveying his knowledge to students. The lectures of original special courses, which were developed and are being given by him, enjoy invariable success among students. His numerous students work in all corners of our country and abroad. L.P. Strakhov has trained 15 candidates of sciences, more than 100 graduation projects have been completed under his supervision. He is devotes much time and effort to work on the editorial board of the journal VESTNIK LENINGRADSKOGO UNIVERSITETA.

A scientist, an educator, a public figure--in whatever capacity Leonid Petrovich appears, contact with him gives enormous satisfaction, because it always gives something new to the person being spoken with. Dedication to science, an active civic position, and fine human qualities have won him the love and respect of his colleagues and students.

In heartily congratulating Leonid Petrovich on his birthday, his numerous students and colleagues with all their heart wish him good health and further creative successes.

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